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Edited by H. J. Finnis.

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grader at [illegible] of weed seeds.

During the month of July, 1917, [illegible] 12,057bush. of bananas, 6,494 packages onions, 96 packages of plants, seeds, &c., [illegible] 72 empty cases were examined and admitted at Adelaide, under the Vine, Fruit, and Vegetable Protection [illegible] and 1910; 1 case of oranges, 30 cases of apples (over ripe), 3 cases of bananas (over ripe) were destroyed. The oranges were unaccompanied by the necessary fruit fly certificate. 113 empty wine casks and 72 empty cases were fumigated. Under the Federal Com-

[illegible] Victoria Square, Adelaide."

[illegible] ested in the [illegible] mission

merce Act, 3,939 packages of dried fruit, 430 packages of preserved fruit, 2,003 packages of citrus fruit, 400 cases of honey, 26 packages of seeds, and 2 packages of plants were exported to oversea markets. These were consigned as follows:—For New Zealand, 430 packages of preserved fruit, 2,433 packages of dried fruit, 2,008 packages of citrus fruit, 26 packages of seeds, and 2 packages of plants; For India, 6 packages of dried fruit and 400 cases of honey; for London, 1,500 packages of dried fruit. Under the Federal Quarantine Act, 1,691 packages of seeds, &c., were examined and admitted from oversea sources; 130lbs. fennel and 14lbs. turnip seed were cleaned on account of the presence of impurities; 14lbs. of a Chinese burr were crushed in a roller mill before releasing for medicinal purposes.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Extraordinary pressure on space has rendered it necessary to very considerably curtail the inquiry department. Replies to those questions of more general interest only have been published; however, every query received has been replied to through the post.—ED.]

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

"E. H. W.," Pereyton, states that a cow was milked before calving, joints rattled; calved, and failed to rise; cleaned, but 12 hours later womb came out and cow died.

Reply—The mistake was milking before calving, which, though intended to prevent trouble, is a most fruitful source of it, and in this case materially contributed to the collapse that followed. The rattling joints and collapse, point to paralysis, due to want of vitamines in food rather than to milk fever, so called, and the prolapse of the womb arose from the paralysis. Should you be unlucky enough to have another case, do not waste medicine, but knock her on the head at once. But to prevent such trouble, let the cow have plenty of exercise during the last month, mixed feed, grass, stubble, a little bran and oats, and 20 drops of tincture nux vomica morning and evening during the last week of pregnancy. Do not milk before calving.

"J. V. C.," Wilkawatt, had a cow which calved, and reared calf in scrub, and quickly went dry.

Reply—It is quite natural for a cow which rears her calf in the wild, or which loses it, to go dry quickly, and it is only under artificial dairying conditions that they have been brought to continue in milk. In her case, when she comes in next, if she has her calf with her for a week, and then is milked regularly morning and evening, it is quite possible she may come into full flow again. A naturally poor milker will never become a heavy milker.

"O. H.," Murbko, reports that a horse, seven years, has a very hoary appearance; body thin and scraggy, slobbers badly; teeth all right.

Reply—The symptoms all point to worms of various kinds, from bots to whip worms. Treatment—Put on bran only for two days, then give a six-dram physic ball. When this has ceased to act give a tablespoon of Fowler's solution of arsenic twice a day in food for a fortnight, then a tablespoon of the following powder twice a day in food for another fortnight:—½lb. each of sulphate of iron, black antimony, sulphur, gentian, 1lb. each common salt and Epsom salts.

"W. A. S.," Geranium, has a cow which has been in with fifth calf two months, has dropped from 3galls. to ½gall.; on good feed with bran and oats; gaining flesh as if feed is going to fat instead of milk.

Reply—This is exactly what is happening, it is quite common for a good cow to pass her prime at the fifth calf, and it will probably be the best to fatten her off as quickly as possible. Of course there may be other reasons for the drop in quantity, but these would require a personal examination to discover. Medicine is not likely to be of much good to her, but possibly 10 drops of tincture phytolacca morning and evening might improve the milk flow.

"A. B.," Koonibba, reports that pigs lie and kick and froth; seem to go mad and blind.

Reply—The symptoms are those of epilepsy, which is often due to worms. When the symptoms are acute relief will be given by bleeding. This can be done by cutting off the tail or cutting the vein at the back of the ear, this is the better method. Ten drops tincture belladonna every three hours to follow. As a preventive give occasionally to each pig 2ozs. crushed castor oil seeds, which will be taken in food, and give regularly charcoal or cinders in feed or in a box where the pigs can get at it.

"J. J. H.," Brentwood, has lambs stillborn.

Reply—The fatness of the ewes is often a cause of this trouble, but a commoner cause is dogs in the night, either or both might have been at work.

"F. H. W.," Rosedale, had a grey pony, generally bright, which grew dull about four weeks before death, and used to bite flanks; had an attack of colic; recovered by aid of drench; was driven 20 miles next day, colics returned in evening, bile passed before death. P.M.—Bots and ulcers of bowel.

Reply—The mistake was working on top of a drench, which is probaly purgative in nature. The bots would have no direct effect on the symptoms, but the small piece of bowel is ulcerated by bloodworms (*Sclerostomata tetracantha*).

"J. F.," Warcowie, has a pony which seems to have strained sinews of hind leg while playing about; the sinews in front below stifle seem to be affected; the leg sticks out behind. The pony can stand on leg, but not walk on it; hip is not knocked down, but there is a strange movable lump below it.

Reply—The symptoms are certainly puzzling to one who has not seen them before, but they point to dislocation of the cap of the stifle; the movable lump, the sticking out behind is very symptomatic. Put a bowline round the neck and fetlock of affected side, pull leg up to shoulder, and push lump upwards and inwards till a faint click is heard; leave leg up for half an hour, then put a blister on.

"S. H. P.," Clare, has a sow within six weeks of time; off appetite, lies down always, constipation with white matter on dung.

Reply—The symptoms point to acute indigestion and constipation connected with her pregnancy, and possibly to an intestinal abscess. It would be well to give her 10 drops of tincture nux vomica morning and evening for a few days, and then 10 drops tincture pulsatilla similarly. These are best given in a little honey or molasses on a stick, from which she will lick it.

"J. H. F.," Port Broughton, states that rusty wire penetrated frog of light mare, wound healed under treatment; then very cold over kidneys, constipated, tongue swollen, and haw very dark, half covered the eye; and very stiff in hind quarters; feverish, paralysed, died.

Reply—The case was either tetanus or as suggested mouse hay poison. On your own confession she should have been noticed earlier, when probably a few doses of Epsom salts and a good rubbing over the loins would have warded off the severe symptoms if it was mouse hay poison.

"W. F. R.," Inman Valley, had a filly, kicked over eye, six inch gash; discharges yellowish fluid, large lump over eye; eye closed, but sight right; jaws very stiff, cannot eat chaff, but can manage a little hay; wound clean, but left for a week on account of wildness.

Reply—Such a wound left is very likely to cause lockjaw, but you do not mention spasms and the flicking of the haw over the other eye when excited, so possibly the stiffness is due to the injury, which is more than probable a fracture of the arch of the eye. If lockjaw, give 6ozs. to 8ozs. of Epsom salts daily in drinking water, hay, and soft mashes. This will do good even if not lockjaw. Dress wound with a lotion of tincture arnica one part, methylated spirit 20 parts, and tincture iodine four parts. The dressing should be at least once a day. It may be well to throw her and feel if there is a fracture, and if so cut on to it and pull out the splinters with forceps.

"A. P. U.," Nantawarra, has a horse with wither bruised by wagon saddle; little swelling if not working; runs intermittently.

Reply—There is little doubt but that a fistula has started. Throw the horse, probe where discharge comes from, open up boldly—very boldly with a big butcher's knife; remove dead tissue from bottom of wound, clean out with petrol. Daily, after till healed, allow clean cold water to irrigate the wound for an hour. If hose is not available, make small hole in kerosine can, pass cotton line, such as plough rein through with knot on top, unravel lower end, and spread over wound; hang tin from beam or limb, and refill as often as necessary to keep up for hour.

"H. E. P.," Nadda, has pigs, 14 days old, which shiver and are weak on hind legs.

Reply—As the pigs are doing well it will be best to leave them alone; they probably caught cold. Let them have charcoal where they can root their little snouts into it; they will soon eat a little of it.

"H. R.," Penola, has a cow with fourth calf, poor appetite, front teats sore and discharge stringy matter and thin fluid, the quarter hard, lumpy, and hot, lumps yellowish and as big as peas and beans.

Reply—The cause of the trouble is hard to determine, as the lumps and scouring point to tubercle, the other symptoms to mammitis, which is prevalent among ewes as well as cows, and may have been transmitted. It would be well to ask Mr. Curtis, Stock Inspector, Mount Gambier, to visit and decide which is the trouble. It is not advisable to use the milk from the other teats unless well boiled, the worst teat will probably go blind. A pint of castor oil would be good for the scouring, and might be followed by a pint of decoction of wattle bark once or twice a day. The soapsuds should be rubbed in as hot as the hand can bear them. With regard to treatment, the inspector would advise after he had determined what the trouble was.

TRAINING AND RESEARCH.

ILLUSTRATED FROM THE AGRICULTURAL VIEWPOINT.

[An address delivered by request at the University of Adelaide by ARTHUR J. PERKINS, Director of Agriculture.]

"Skill is of greater avail to the woodman than strength; skill steers the vessel in the teeth of the gale; skill is triumphant in the chariot race."—Iliad, XXIII., 315-318.

INTRODUCTORY.

Let me at the outset state how highly I appreciate the honor of addressing you to-night; but, at the same time, let me confess to the wish that both talent and leisure were mine to do adequate justice to the task before me. I am required to speak in support of "Technical Education," connecting with it, as occasion offers, the cognate question of "Research"; and, as becomes my position, I shall draw inspiration from the agricultural needs of the State. We undoubtedly owe it to this sensational period in our history that these two questions, long forgotten in the shadows of public neglect, should be somewhat hastily dragged out into the full light of day; and unquestionably, within recent times, throughout the British Empire, both questions have been very amply and very adequately ventilated, with rather marked emphasis, perhaps, on what are assumed to be the shortcomings of our race, relatively to the determination to rise of another. Indeed, so thoroughly has this been done that it appears highly improbable that I should be able to bring even a modest brick to the temple of national efficiency which our most gifted minds have been so intent on erecting, or, perhaps, on designing. I realise, however, that one can owe a duty to the "end in view" even though one take no shining part in the "means towards it." Not all of us, perhaps, are equally alive to the issues at stake; and even the man who succeeds in arousing interest, where previously there was none, is contributing somewhat to the good cause; and this honorable role, I trust, may be mine to-night.

APOLOGIA.

In this connection, I might, perhaps, without undue vanity, claim "personal experience" as sufficient sponsor for what I shall have to say on these two questions; for some 22 years I had occasion to wrestle with one special branch of technical education, whilst over a greater

period of time, to the extent of my abilities, I have endeavored to unravel some of the problems that beset local tillers of the soil. But, in such matters, notwithstanding its modern deification, I am distrustful of personal experience. We may not dispute, it is true, that the "man of experience"—the "practical man," as we say—has lived and acted; but his personal adventures, however materially successful, are no necessary guarantee that he has thought very deeply. And in the circumstances, when from the limited resources of individual experience, he attempts to generalise, the results are apt at times to weigh but little in the balance of successful endeavor. And yet, in the matters that lie before us to-night, it is much to be feared that there is little else that I can offer you beyond what has actually befallen me, or come directly within my ken. True, I harbor the impression that during the course of my active life I have not only "acted," but have "thought" as well; and in your interests to-night I most sincerely trust that such may prove to have been the case.

Now, I know that all this must sound very egoistical; but I have felt somewhat uncertain as to my real standing here to-night, and thought it advisable to clear the way for those who may still be inclined to question the propriety of Saul's presence among the prophets.

The University and Technical Education.

May I, at this stage, congratulate the University on its championship of the cause of technical education? And in doing so, I am not blind to the fact that there are those who will not hesitate to cast doubts on the sincerity of the intent, or on the fruitfulness of the effort. They will probably contend that from time immemorial the general trend of University endeavor has been in directions quite other—that, in the words of a French writer, it has aimed "at the moral rather than the material progress of humanity." Hence, if indeed we grant the premises, justifiable doubts as to the trustworthiness of sudden conversion on the one hand, and, on the other, as to the capacity of recent converts to handle efficiently an unfamiliar task. To fears such as these, I imagine that it may with justice be replied, that if at any time ideals of this kind have held sway in University circles, they have now been unsaddled; that it can be shown that within our times, at all events, the boundaries of University sympathies have included both the transcendental and the materially useful. Indeed, from the day in which Universities first undertook to teach the healing art—surely above all others a utilitarian art—from that day they claimed their share in the burden of technical education. Fortunately, or unfortunately, I have not even a nodding acquaintance with the law; but I doubt much whether its luminaries would admit of its inclusion among

the useful technical arts. On the score of engineering and agriculture I can have no such qualms; and it is, I think, much to the credit of the young University of Adelaide that early in its career it admitted to the inner temple these two useful arts.

But, from the historical point of view, is it altogether correct to affirm that University interest in technical education is of comparatively recent origin? I cannot claim any special knowledge of University history, but I seem to recollect that in the dark ages, when the "professions" and the "manual crafts" walked cheek by jowl on terms of comparative equality, that in those days, true to their name, the ancient Universities busied themselves with all lines of human activity; and it appears to me that we owe it perhaps to the organising industrialism of modern times, which has substituted the machine for the master craftsman, that Universities have lost touch somewhat with the educational yearnings of the masses that surround them. Complete reversion to the older order of things is admittedly impossible; no University can hope to take complete control of technical education. They can, however, keep in sympathetic touch with special institutions which must arise around them; they can stimulate these institutions, breathe into them a spirit of tolerance and broad-mindedness, and offer ladders of ascent to those whose restlessness, or ambition, or mental qualities seek broader horizons for their mental development.

It follows, therefore, that in the awakened public mood that at present obtains, Universities, even if they would, could not keep aloof from technical education; in some cases they must assume full responsibilities for actual training; in others they must assist, quicken, inspire, and direct aright the public instinct, which might easily be sidetracked by quacks, faddists, and false teachers.

The Claims of Higher Technical Education.

I am rather inclined to think that in the popular view technical education or training does not cover as wide a ground as we are claiming for it to-night; too often, its scope is supposed to be limited to the development of skill in the arts and crafts. And yet, on reflexion, we must all realise that all the manual skill in the world must, from the nation's point of view, remain comparatively barren unless directed along fruitful lines by the technically trained minds of organisers and contrivers. I have no wish to detract from the value of skill in the artisan; we cannot do without it; our welfare demands that it shall be developed to the highest pitch. By all means, therefore, and as a matter of course, let us provide ample means for the ready acquisition of a high degree of skill in the manual arts and crafts; this is one of the essential functions of technical education. But if, as a race, we are

to retain leadership in the pleasant arts of peace as in those of war, the minds of those who are to organise, to direct, to utilise this acquired national skill, will stand in need to an even greater degree of that type of training which alone leads to unquestioned supremacy. I am not here to suggest that the imparting of even this higher training should be confined to the Universities. And were it so, there are two dangers that I should fear—the creation of a special "caste," on the one hand, highly undesirable in these democratic times; and on the other, some degree of supineness, the inevitable result of lack of competition and an unassailable position. Nor in educational and training matters am I an advocate of anarchism, since quacks and faddists are often more to be feared than formalists. I feel certain, however, that it is not in the interests of the public good that any individual or institution should feel unreasonably secure in his or its position. The Universities can and should do much towards directing the march of events; in many instances they must take a hand at the wheel; in others it should be their influence that keeps the helmsmen on the right course. In final count, our ideal should be a nation free and efficient through all its rungs, from the top to the bottom of the ladder, and with helping hands at every rung; efficiency, the foundations of which reach down to the training of youths taken in the recruit stage—and this is technical education—and subsequently expanded and crystallised by the innate qualities of the race. And this efficiency—if, indeed, efficient—must lead to increased national production and wealth, greater general leisure, and a higher standard of general mental and moral culture.

Good General Education Must Precede Technical Training.

We shall probably agree that technical education, whatever its scope, embraces in final analysis special training, having exclusive reference to the particular vocation in life which a young man or a young woman proposes following; essentially, therefore, it concerns adolescents, and not boys and girls. I am led to make this somewhat obvious remark because of the peculiar attitude on the subject which is at times noticeable in some quarters. I rather wish to emphasize the fact that general education and technical training are two things apart, and that it is not to the interest of the nation that they should coalesce. We are tolerably familiar with the complaint of the parent who bewails the fact that his 15-year-old or 16-year-old son has apparently learnt nothing at school which can be converted into immediate cash values. Such a mental attitude, which is by no means uncommon, overlooks the fact that school age is, or should be, sacred to interests of even greater import than immediate material advancement; or, as it has recently been very tersely put, that saleable knowledge is *not* education.

I feel very strongly the need that our people should be adequately educated as well as technically efficient; and whilst making no pretence to despise the immense advantages which technical efficiency confers upon a nation, I incline to the belief that in the battle of life the moral factor in education is likely to stand us in even greater stead. I should state here that it is my intimate connection with one branch of technical education—agriculture—which gives to me a lively interest in this particular aspect of the question. It has become the fashion to urge—rather shallowly, as it appears to me—that education in country schools should proceed along *agricultural* lines—whatever that may mean—and not on the lines hitherto pursued. As to the educational value of the teaching at present being imparted in our country schools, I do not feel called upon to offer any opinion; I may state, however, that if this teaching does not differ materially from that obtaining in the city schools, and if the latter is judged to meet the educational needs of the nation, then equally adequate must be the teaching imparted in our country schools. In other words, I shall maintain that be he of the city or be he of the fields, every child in the land has the same native rights to educational facilities; and that to brand him indelibly with specialism in his earliest years is nothing less than a grave infringement of these rights. Let us reflect: Is it just that the community should take upon itself to determine, for all time, what shall be the future careers of children of tender years? Much as I would like to see our countryside more densely populated, I would, in our days, deem criminal any system of education so manipulated as practically to tie down to the glebe country bred lads, and deny them the opportunity to test in other directions the dreams and ambitions of adolescence.

In the end, perhaps, everything hinges on what we understand by education—a question outside the range of my present address, and far too vast to be raised as a side issue. I shall, therefore, content myself with the statement that whatever else it may include, I always like to think of education as the key to the accumulated wisdom of the ages—and our common heritage. Nor, in the circumstances, can I conceive of a lower ideal of what education should be than an efficient device for building up money-earning machines, or, as has recently been stated by a learned Bishop, "a patented contrivance for getting on."

In summary, and with apologies for the diversion, I suggest that early education, which builds up the man, and upon which specialised technical education must ultimately rest, should be uniform in character throughout the State, and have no conscious connection with future

careers; when the ages of 16 and 17 have been attained to, it will be time enough to divert faculties and ambitions along wage-earning channels.

The Home Training of the Agriculturist.

Hitherto, in an endeavor—rather inadequate, perhaps—to picture the position as I see it, I have perforce dealt with generalities. I now propose coming to details from the point of view of that side of technical training which has hitherto represented my life's work.

And, at the outset, does the agriculturist really stand in need of technical training? It would seem not, in the estimate of many, who throw up familiar, unrelated tasks to make their fortune on the land. It would seem not, too, if not only here, but throughout the world, the low percentage of those following rural occupations who have gone through a recognised course of technical training be taken into consideration. In matters of this kind, however, we should beware of unintentional exaggeration; and we shall have to ask ourselves whether, in fact, most agriculturists do not go through a course of training, and a rigorous one at that?

Let us, for the sake of simplicity, take the case of a market gardener blessed with a family of reasonable size. From their earliest days these children of his will have ample opportunity to familiarise themselves with the secrets of paternal success; and, later on, to the extent of their powers, they will generally be made to contribute to it. To claim for cases of this kind the ideal aims of technical training would, I am afraid, do violence to my personal convictions; too often they trench openly or subtly on the forbidden ground of child labor, and always they anticipate forcibly the future careers of those chiefly concerned. But these considerations apart, and given good natural aptitude and inborn love of the work, it is difficult to imagine training in market gardening more thorough than the early, if involuntary, apprenticeship of the son of a successful market gardener; providing, always, however, that he elected to follow his father's calling under conditions substantially similar to those with which long custom had rendered him familiar.

Now, from the market gardener the argument may be extended quite logically to the farmer, who lives in times of economic stagnation, and occupies a locality in which, out of the experience of generations, have crystallised more or less immutable farming practices. And, in summary, the gist of the matter is that so long as the son finds himself confronted with an environment essentially similar to that of his sire, the training imposed upon him should, as a rule, prove equal to the usual contingencies of life.

Hence, notwithstanding inherent inelasticity, it would involve a contradiction of terms not to recognise in the hereditary farmer true technical training. We shall have to recognise, too, that whatever we may do or say, the majority of the sons of agriculturists will continue to receive their training at home; and, in addition, if subsequently they elect to put into practice the traditional family methods at home, or in its immediate neighborhood, we shall have to admit that from the revenue-earning point of view this training could not perhaps be bettered; and, after all, is not this the crowning justification of technical training?

Change of Environment Renders Technical Training Imperative.

These facts notwithstanding, I cannot be expected to subscribe to the view that the son of the successful farmer would not be the better, both as a farmer and as a man, could he but add to his hereditary equipment a regular agricultural college training. I could not conscientiously endorse this view, even if it were in my power to immobolise economic conditions, and to guarantee to father and son alike identity of physical environment. Fortunately, or unfortunately, neither of these two conditions is within practical reach of any of us; and in this country, perhaps more than in most, their very elusiveness must in times ahead of us speak powerfully in favor of extra-paternal agricultural technical training.

I have stated that home training was often good, indeed excellent, under favorable conditions; but only so long as economic conditions remained tolerably stable. Economic stagnation we may imagine to obtain, even for lengthy periods of time, in some of the older established farming communities; and it is here that traditional farming shows up to best advantage. But even here, the cheapness and rapidity of modern means of transport, and the thoroughness with which the markets of the world are explored and exploited, are apt, at inconvenient moments, to disturb even the most sober of local markets; and it is then that the parochial farmer is faced with heavy loss, because in some distant portion of the globe his particular specialty can be produced, conveyed, and sold on his own particular market at lower cost than he himself is able to do; and in such cases time-honored paternal rules are apt to fail, and the lack of more liberal outside training is most acutely felt. But if this can be said of countries in which rural economic conditions are normally steady, infinitely truer is it of those others in which economic conditions can only be described as being in a state of constant flux. I need not add, perhaps, that in this I have particularly in view our own country and the conditions that surround us.

Local Rural Economic Position.

Our economic history, to the extent that it affects rural conditions, can be sketched in a few sentences. First came the pioneering days and the murk of unknown conditions, and dreams were dreamt the while we groped after realities. Sheep, by displacing the native fauna over open plains and park like grass lands, first showed us the way to economic independence. Nor was the plough altogether idle, though less venturesome in those early days; gradually, however, it pushed its way forward in the tracks of favorable rainfall conditions, and, in its eagerness, even overstepped them at times. And to-day we have almost reached the limits of exploration and nominal occupation of land adapted to agricultural operations; nay, it is possible that even in these days we are in some instances attempting against Nature to cultivate land which should never have been wrested from forest conditions. Hence, we may be said to be entering upon a new economic phase, involving radical changes in practice and mental attitude alike, and in which it is to be feared the shedding of hidebound time-worn coats is likely to prove painful to many.

Hitherto we have specialized in large areas, hasty and relatively slipshod methods; we have reduced man power to a minimum, and pinned our faith to machinery. And hitherto we have had no reason to quarrel with the results secured; it is to practices such as these that we owe our great pre-war prosperity. If, in the past, average individual crop yields have not been high, they have been secured at comparatively low cost; and low net returns per acre have been amply compensated for by the large size of individual holdings. In brief, without the aid of artificial tariffs, and frequently in the teeth of hostile ones, we have hitherto been able to dispose of the produce of our fields to our own advantage on the markets of the world; which fact is probably the best justification of the methods and practices of the past.

It cannot, however, be disguised that from the point of view of agricultural economics, we have come to the parting of the ways; we stand now, as it were, between extensive and intensive farming; and unless we realise the fact, and welcome it, our agricultural interests, and with them the whole State, are likely to be compromised. Indeed, in this direction there are several factors which are goading us forward overwhelmingly, if slowly; and the disbandment of soldiers, as soon as we shall have attained to glorious peace, will but lend added impetus to the pressure of economic events.

I have already stated that we have practically overtaken the supply of vacant land adapted to agricultural purposes; and the inference is that unless as a community we can acquiesce in stagnation—which is unthinkable—we shall have to set about retracing our steps, and sub-

dividing land which is at present ineffectually occupied. In our best districts, present-day large farms will have to disappear, or else be held co-operatively by several owners. We shall have to modify our ideas as to what is an average-sized farm; and in ever-increasing numbers, wherever conditions permit of it, we shall have to build up profitable small farms.

But it is not only lack of available land, and redundance of prospective settlers, which are driving us towards concentrating our energies on smaller individual areas; equally impelling us thereto are other powerful economic factors, such as the rise in land values and in the cost of production, which are slowly whittling away the narrow margin of net profit hitherto available.

The Economics of Wheat Growing.

Let me illustrate this point from the present position of wheat growing, which has hitherto absorbed nine-tenths of our agricultural effort. Whether wheat growing pure and simple can be profitably followed as a calling depends on a series of economic factors, which can be summarised as follows:—

1. Rent, or interest on capital value of land.
2. Cost of production and delivery to market.
3. Average grain yields, since with us, in average circumstances, straw has no market value.
4. Local market value of the grain raised.

Each one of these factors can, individually or jointly, determine the profitableness, or the lack of it, in wheat growing.

If we assume cost of production, yields and prices to remain stationary, then beyond certain limits increase in rent, or rise in land values, can by its solitary action drive the wheatgrower off the land. For the sake of argument, we may assume cost of production, inclusive of interest and depreciation on working capital, taxes, general expenses, &c., to be represented by 35s. an acre; and 15bush. at 3s. 6d. a bushel, to represent average yields and prices. Exclusive of rent, this would represent a net return of 17s. 6d. an acre every other year, since in our present practice wheat is almost invariably preceded by one year of non-revenue yielding, bare fallow, or a net return of 8s. 9d. per annum, which is 5 per cent. on the capital value of land worth £8 15s. an acre. Now, if other factors remain stationary, and land values rise above this figure, wheat can no longer be said to be paying reasonable interest on the capital value of the land.

We have undoubtedly had instances of this kind in the past, and it is certain that they will present themselves in ever-increasing numbers in the immediate future. The position is, therefore, that there are

men in our midst, limited in number, perhaps, who are growing wheat, the returns from which do not pay interest on the capital value of the land; and it may be asked, short of bankruptcy, how can this be done? The factors supporting this uneconomic structure are not far to seek. In the first place, many farmers employ practically no paid labor; the farm is worked by their own strong arms and those of their immediate household. Hence, there are no outgoing expenses in the form of labor sheet; and hence—such is human inertia—no critical balancing of accounts, nor determination of real cost of production. Hence, again, we see farmers so circumstanced continuing on the land, outwardly solvent; they cannot, however, escape the inexorable claims of rent or interest; and when, in reflective moments, they probe into their positions, they must conclude that in return for their independence—which they rightly prize—wheat frequently remunerates them at rates which would never be accepted by an equitable Wages Board; or else, that capital invested in land returns interest which elsewhere would be considered wholly inadequate.

Secondly, and from another point of view altogether, minor industries and occupations, such as a cow or two, poultry keeping, dealing, road work, and carting in unoccupied hours, &c., frequently serve to mask the economic situation and to keep the farmer on the land.

I fear that details such as these must prove wearisome to a general audience. I have deemed them unavoidable, however, in order to justify the statement that, in many cases, farming practices which in the past have borne us triumphantly along, stand in need of radical modification to-day.

What, then, is the remedy? How are we, as a people, to meet this threatened change in economic conditions? Cost of production is not likely to recede, rather the contrary; and prices are at all times on the knees of the gods; we can but hope that they continue favorable. Hence, in ultimate analysis, there remains but the possibility of improvement in general average yields. On this point I could say much, but shall refrain for fear of straying too far afield. I must content myself with the statement that the gradual reclamation of new land hitherto very imperfectly farmed, coupled with anticipated improvement in the practices of many who in the past have lagged behind, must in the end lead to appreciable improvement in general State wheat averages. But, given continued identity of practice, I doubt much that the present average yields of our best farmers are capable of being improved upon in the future. In other words, I am of the opinion that in the matter of wheat averages the best exponents of present-day farming have probably reached limits beyond which climatic conditions effectively bar the way.

Let us recapitulate: The average margin of profit on present-day farming—which is wheat growing in overwhelming proportion—is exiguous; nor can it realise average home comforts unless associated with abnormally large holdings; for small land owners, in many instances, the price of independence is low wages and poor living; the cost of production cannot recede; grain prices are vacillating and undependable; improvement in yields is probable, but not to an extent to affect the general economic position; whilst, on the other hand, the available supply of arable land is well nigh exhausted, and the voices of those crying for land are multitudinous.

Complex Husbandry Essential.

What then? It is idle to suppose that future progress can be made to depend on material increases in the yields of individual crops—although under altered practice this is not an ideal altogether impossible of attainment—but rather on the increased general productiveness of small holdings, and the adoption of more complex forms of husbandry, leading to wider livestock operations, and the intimate association of the latter with the growing of crops. An ideal such as this implies a complete revolution both in practice and mental outlook, which normally can be realised only slowly and progressively. Our material interests, however, clamor for progress that shall be both rapid and smooth. There are many things that we shall have to learn in adapting ourselves to the circumstances that are ahead of us; and among them that, in the end, it is best for the individual, as it is for the State, that human effort should be concentrated on relatively small areas rather than wastefully dissipated over the wilderness; and that, independently of anticipated increases in gross returns, concentration of effort will help to blot out from our midst that isolation, and the distrust engendered by it, which have hitherto barred the way to successful co-operative effort among South Australian farmers.

Future of Agricultural Training.

And what part shall training play in the changes we sense ahead of us? If we are wise, it seems to me, and allow it unhampered action, training will do much towards softening the asperities of sudden change in practice and outlook; it will, at an early date, lead to a degree of efficiency which could not otherwise be reached except by long and costly effort, blindly groping after results and overwhelming many in fruitless endeavor. It is not suggested that farmers, as a whole, should be put to school to learn a new trade; apart from its impossibility, there would, in any circumstances, be little to be gained by it. Our farmers are an intelligent body of men, who on various occasions have already shown their willingness to modify practice in

directions that could be shown to be materially advantageous. And I have good reason to believe that, as in the past, so in the future, they will follow the lead of successful pioneers in any new movement. Moreover, in the Agricultural Bureau system South Australia has an invaluable educational instrument, capable of spreading far and wide the new gospel, and even of enforcing it.

Training, therefore, must in the first place reach the leaders and the new settlers; and, although on different lines, to an equal degree, perhaps, those who in subordinate roles will contribute to the success of the new movement; in the end those able to acquire training will prove the leaven which will leaven the whole. I now propose sketching out in rough outline how I conceive that this influence of training can be brought to bear on our future agricultural progress; and in doing so I shall not be unmindful of the fact that our ideal of efficiency embraces every rung in the ladder of agricultural workers.

Present Lack of Competent Farm Laborers.

Hence, at the outset, I shall point to the common complaint that here in South Australia, whose national wealth is mainly drawn from rural enterprises, competent farm hands when called for are practically not to be had; and I shall add that the complaint is well grounded on fact. But in present circumstances, how indeed could it be otherwise? It is only long practice, life's work, that can confer any satisfactory degree of manual efficiency; and how can we look for it among the lacklands, when ninety-nine hundredths of the farm work of the country is carried out by the landowners themselves? This is not the recital of a grievance, but a statement of fact, for which general economic conditions can alone be held responsible.

But if ever, in days gone by, at harvest time and at other busy moments, farmers have had occasion to deplore both the scarcity and the unsuitability of available labor, unless in the interval radical change supervenes, their cry in the future is likely to be otherwise frequent and acute. We shall have to realise that intensive farming implies the concentration of capital on small areas, the bulk of which will be absorbed in labor; that high gross returns cannot be secured except by corresponding outgoing expenditure, chiefly in the shape of labor. And when large farms, on which at the present time little or no outside labor is being employed, come to be split up into smaller units, it will be found that several permanent hands will be absorbed by individual subdivisions, worked on more intensive principles.

How to Attract Labor to the Land.

How are we to secure this absolutely essential farm labor, without which there can be no great agricultural progress? We shall have to

attract to rural occupations a reasonable proportion of the rising generation; we shall have to persuade the majority of those reared in the country that it is to their interest to continue there; we shall have to bring under the notice of those born in the cities, but hankering after open spaces, that there are open to them in the country careers quite as attractive as those offered by city shops and factories and streets. Questions of this character admit of discussion at great length; but as they are only incidental to my subject matter, I shall confine myself to the enumeration of a few propositions bearing, as it appears to me, on the main issue at stake.

1. Future closer settlement and intensive farming operations should tend to cluster our rural population into important social groups, which should destroy the loneliness of empty spaces and help to neutralise the attraction of city centres.

2. Intensive farming should offer continuance of employment over the greater portion of the year.

3. Both wages and working hours would need to be based on equitable lines corresponding to those in force in other forms of employment.

4. Housing of farm hands and board, when provided, would need to be reasonably good.

5. Rural centres should be provided, with facilities for self-improvement and for general social relaxations.

6. The old custom of competitive tests of skill in rural manual operations should be revived in all country centres.

7. Both with a view to home creation, and as a means of tiding over temporary unemployment, the acquisition of small blocks of land by rural workers should be encouraged in every way.

8. Thrift and industry should be promoted to the end that every rural worker of moderate attainments may, if he chooses, become ultimately a farmer himself.

Means such as these, and others which I have probably overlooked, should serve to check the regrettable exodus of country youths towards the cities, and in many instances will perhaps set up a counter current countrywards.

Training of Farm Hands.

Now, as to the training in manual deftness, I see absolutely no reason why youths wishing to qualify for rural occupations should not, under suitable guarantees and the supervision of State authorities, indenture themselves as apprentices to approved farmers. Remuneration and conditions might be mutually agreed upon, or, preferably, be determined by law imposing effective guarantees on either side. Something in this direction I have already endeavored to do on our Government

farms, not with much success hitherto, it must be confessed; mainly, however, because of the disturbed condition of the times; and I hope for better things as our affairs improve.

Finally, I am sufficiently sanguine to anticipate the times when attendance at High Schools or at technical classes will be compulsory upon farm apprentices, as it is intended that it should be for the trade apprentices of the cities.

Agricultural College Training.

But it must be clear that all the acquired cunning that the hand can command is of little avail unless under the direction of the well-trained mind able effectively to register and analyse the daily happenings of life. If, therefore, we are ready to supply the skilled laborer, it behoves us to make equal provision for those who must map out and direct his activities. In this connection it is not vitally essential that the leader, or farmer, should have acquired the same degree of manual skill as the man whose special business it is to carry out the work: it is, however, of immense advantage to him to be intimately acquainted with all the minutiæ of the operations in which may be engaged those under his direction; indeed, hitherto knowledge of this kind has frequently represented the deciding factor in success. And it is for reasons of this kind that we see all Australian Agricultural Colleges attaching paramount importance to farm manual operations: they have been looked upon as typifying the immediately practical side of the farmer's business; and such indeed they are, and will continue to be, so long as with unaided hands the farmer carries on the great bulk of the farm work. It does not follow, however, that this state of affairs must continue indefinitely; indeed, already in our midst there are many exceptions to the general rule; and it seems likely that the "practical" man of the future will be the master mind who directs and instructs his men, and manages the business of the farm. Come what may, farm manual training cannot with safety be overlooked in any Agricultural College; in giving to it full weight, however, we are not necessarily bound down to the methods hitherto adopted in Australia

From our present viewpoint I shall now draw attention to two drawbacks, attaching to the type of training hitherto unavoidable in all Australian Agricultural Colleges. The fact that fully half the time of students is absorbed in direct manual operations curtails very seriously the time available for theoretical and professional training; and a three years' course actually represents no more than one and a half years' training in essential fundamental principles. Hence, if consideration be taken of the range of subjects—both auxiliary and

technical—which must be covered during these mutilated three years, and of the inadequate early grounding of most of those attending Agricultural Colleges, I am compelled to admit, as a matter of personal experience, that this three years' course is all too short; and, unfortunately, in many cases it is even reduced to two.

Another disadvantage of the present system, if conscientiously administered, is that it sets very rigid limits to the number of students whom it is possible to admit at any one time. If in your training you are aiming at manual efficiency, it is clear that this efficiency cannot possibly be attained unless the number of students present is strictly proportional to the area of the farm on which it is proposed to train them; and should students be enrolled in excessive numbers, the opportunity for acquiring manual efficiency must *ipso facto* disappear, and with it the foundation on which college training has hitherto been ostensibly based. On the other hand, it is easily understood that an indefinite extension of College Farm areas is out of the question; hence it may be stated very definitely that no single college can pretend to offer adequate facilities for farm manual training, whose average enrolment exceeds 90 to 100 students in any one year; and even this number would prove difficult to handle in adequate manner.

It would seem, therefore, that if greater numbers than hitherto are to be attracted to our Agricultural Colleges—and in the future there is likely, in my view, to be urgent need of it—drastic changes in policy and methods may prove unavoidable. It may even be possible, without detriment to the student's ultimate training, to eliminate ordinary farm work altogether from the College curriculum, and ensure professional training extending over not less than two complete years, equivalent to a four-years' course as at present conducted. It should be added that dispensation from the actual routine of farm work does not imply the doing away with all practical work. Instruction in the latter could still be imparted through the medium of the usual practical and field demonstrations.

I anticipate a chorus of disapproval to a proposal which will be said to sap the foundations of methods and practices which have proved eminently successful in the past; and, although this objection cannot be disputed, I am fain to reply that the dead must bury their dead, since no other means of throwing open to allcomers the portals of agricultural training are financially feasible.

Let me not be misunderstood, however. I am far from undervaluing efficiency in manual operations. I believe that every farmer should possess of it as much as he can secure. But it does not follow that an Agricultural College is the best possible place in which to acquire it; rather the contrary, perhaps, because of the artificial

character of many of the operations in which a College may be involved. Let us take the case of a farmer's son, born and reared on a farm, intimately acquainted from his earliest days with farm operations, in which, indeed, he will almost invariably have taken part. Is not such a youth more or less wasting his time when he assists in the routine of farm work on an Agricultural College farm? Would he not be better employed in acquiring additional technical and professional insight into matters pertaining to his future calling? It will perhaps be admitted that the omission of farm work from the course of training cannot seriously impair the future efficiency of the farmer's son. But what of the city-bred lad who wishes to go on the land? In his case, manual efficiency can be provided for in other ways than by absorbing half of his time in farm work, at the expense of his professional training at an institution, the upkeep of which is always unavoidably costly.

It is true that a limited number of novices could always be accepted for manual training on the farm of the Agricultural College itself; and perhaps combining with it the while a certain amount of instruction in the sciences. They should not, however, be admitted to technical training until reasonably imbued with the atmosphere of agricultural operations and versed in the routine of farm work. Some could be admitted for similar training on the various Government farms; others again could serve a period of apprenticeship with approved farmers. In short, none need enter upon a course of technical training without some preliminary acquaintance with farm operations and work. Nor should diplomas of general proficiency be awarded except to the complete satisfaction of those best able to judge in the matter of general manual work. In Engineering degrees, it is, I believe, customary to suspend the issue of official diplomas until such time as evidence can be produced of practical work actually accomplished. From the viewpoint of agricultural training, however, it would be a fatal error to make practical work a *post* degree affair; half the value of the training would be lost unless the student can bring with him to college, as an essential part of himself, the atmosphere of the farm; and this, in my view, should at all times be insisted upon.

The elimination of compulsory farm work from an Agricultural College curriculum would open the door to day students, who could find their board elsewhere; and in this manner immeasurably increase the number of those who could take advantage of the training offered, and this without great cost to the State.

In putting forth this proposal I can sympathise with the heathen Clovis when compelled to burn the gods he had once worshipped and to worship those whom erstwhile he had burnt. It has been no small surrender to make; but in our probable need, I see no alternative if

indeed in the near future we are to offer to the rising generation adequate facilities for acquiring technical agricultural training.

University Training.

The University of Adelaide, although conferring a degree in Agriculture, has hitherto abstained from imparting direct technical training in agriculture itself; it has instead accepted the training given at the Roseworthy Agricultural College, and contented itself with insisting upon a higher degree of competency in the auxiliary sciences. This moderation has not been copied by the sister Universities of the neighboring States, who have boldly established Chairs of Agriculture in their midst.

If the respective efforts and achievements of the past were to be balanced up to-day, it is a moot point as to whether after all ours would not prove to have been the wiser course; but concerning the future orientation of our policy, it would perhaps be rash to speculate. Nevertheless, in this connection it must be admitted that, in a measure, fate has already been forestalled by private munificence. Mr. Peter Waite's public spiritedness has cut the Gordian knot and definitely committed the University to an Agricultural Experiment Station; and it seems almost inevitable that such an institution should eventually be followed by a Chair of Agriculture. I entertain no doubts as to the potential value of an Experiment Station, nor, given the soundness of its human material, as to its ultimate success. Of the prospects of lectures from the Chair, on the other hand, I am more dubious, particularly if for that purpose it were to be born out of due season, in which case I fear it would be easier to found the Chair than to find the students.

University Agricultural Experiment Station.

Hence, I deem it both logical and expedient that in point of time the Agricultural Experiment Station should precede lectures from a Chair of Agriculture; the former will pave the way for the latter. The main purpose of an Experiment Station would be *Research Work,* and here, with deference, I suggest that purists may have to revise the conventional limits they have ascribed to research, and to recognise that research is still research, even though undertaken for purely utilitarian ends. Research work at an Agricultural Station, although not exclusively so, would have a strong utilitarian bent; and I hazard the opinion that it could but add lustre to any institution with which it happened to be connected.

Where, it may presently be asked, is the particular need for agricultural research? And, assuredly, such inquiries will find no echo in University circles; they know too well that research is free as air;

that it bloweth where it listeth, that it concerns the stars, the earth, the ponderable, the imponderable, the finite, the infinite; that it knows no limits but man's choice. There are none to-day who would care to maintain that the last word has been said in any line of human activity; and that, I take it, is the best justification of research in any department. But apart from its purely subjective interest, agricultural research is likely to have a very direct bearing on mundane affairs. And particularly is this likely to be the case when the intensive farming flood, which we see gradually gaining strength, is at its height; questions innumerable will arise on all sides; and, if our untrodden tracks are to be dimly lighted by beacons trimmed elsewhere, there are many who will be led astray. There is room, then, in our midst for an Experiment Station, which, in matters of agricultural moment, can take a coldly impartial stand, and weigh in the balance the hasty judgments of men.

Imagine an Experiment Station under able and imaginative leadership; a beehive of industry delving into questions vexing the souls of men from the more militant walks of life; in the world, but not of it, and yet in sympathy not detached from it. Follow the issue of periodical statements of work achieved, meagre at first, but gradually swelling in importance; valued, first at home, catching the world's attention in time. I have already expressed doubts as to the probable success of a local Chair of Agriculture; such doubts are inadmissible should the Experiment Station succeed: the success of the one would be but the prelude to the success of the other. Let but the work of the Experiment Station develop, let its reputation be built up by patient and diligent endeavor, and just as, in the Middle Ages, it was the men—or rather, their works—which drew students from all parts of the civilized world, and not mouldering walls, so we may anticipate that without intentional effort, and of their own initiative, those we need most will be attracted to the University. In other words, we shall need agricultural leadership in the future: let the University prepare the way for it.

University Research.

And now, although I am shocked at my own temerity, I propose dropping the particular and taking up the general. With due deference, but with unpardonable liberty, perhaps, I am about to extend conclusions drawn from a consideration of questions purely bucolic to University matters in general. And I shall ask is not a University maimed and cut off from the sources of inspiration that is not steeped in research work? Is it any better than a glorified high school? Is it helping to extend knowledge as well as passing it on? And if not, is not

the act of passing it on in danger of becoming altogether mechanical and perfunctory? I have heard of the many obstacles that lie in the way of research; of the inadequate buildings, the lack of funds, public apathy, and what not; I have heard of these, I say, nor can any one doubt their validity. It is a matter of experience, however, that some obstacles are easiest circumvented by ignoring them, and I am persuaded that neither penury nor lack of equipment could have held back those mainly responsible for the unprecedented material progress of the nineteenth century. As a matter of blunt fact, it is not buildings that make research, nor equipment, nor abundant capital, nor even exceptional attainments, so much as the humble determination to do and to achieve. The University stands in need of many things to-day: that this is realized, and that redress is sought, is of the very essence of progress; in the end, however, only realization expressed in deeds can control events. I fear much that a parade of poverty cannot help us to riches; not even a glittering display of good intentions, had we but the means to compass them: but rather discreet emphasis on what has already been done, and is being done at the present time. Let us show unmistakably that we have deserved, and do deserve, support, and eventually we shall command it.

The Essentialness of Publicity.

This humble suggestion raises an important issue, happily the last for which I shall crave your attention. I have gently hinted at the need—the urgent need, as it appears to me—of greater publicity in University work. And in stressing this point I feel that I am perhaps treading on delicate ground; nor am I unaware of the instinctive repugnance of many to anything savouring of self-advertisement. Nevertheless—and here I stand on firmer ground—the University, although a cluster of gifted individuals, is in ultimate resort a public body, and as such is not without duties towards the public, whose support is essential to its continued existence. A craving for the limelight may be a detestable weakness; work may be its own reward; the seeker after truth may be careless of the approval of any but his peers; research work may be more or less a matter of lonely furrows—all this and more may be true, indeed praiseworthy from the individual viewpoint. But it leaves untouched those particular University needs which strong local approval can alone satisfy. Let the lonely furrows carefully drawn out in seclusion be as numerous as they may, of what avail are they in what immediately concerns us, unless from neighboring highways and byways plainly visible to the owners of the enclosure? In fine, if the active support of the public is to be enlisted, it must be given periodical glimpses of what is being done. Doubtless

individual distinction can come to those whose doings are chronicled in the specialist pages of the periodicals of the world. Division, dispersal, however, never yet made for strength, and the scattered individual efforts of a young University can make but a poor showing. Gather them together, on the other hand, present them periodically in a body as the work of the University, and like drops of water whose persistence eventually wears away the hardest rock surface, they will at first attract the attention, and in the end the strong support of those for whom the University was brought into existence.

Conclusion.

Ladies and gentlemen, we have been in pursuit of efficiency, material and moral, and the course has been long and devious; nor can I be sure that I have lighted the landscape to best advantage. Shall I add that we have even caught fitful glimpses of our quarry, and if so, it rests very largely with ourselves whether they shall ever materialise. This chase after betterment, however, is no very modern task; it is as old as the consciousness of the human race; indeed, when the world was young it probably carried with it greater zest. Let me quote to you the blind bard's saying of over three thousand years ago: "Skill is of greater avail to the woodman than strength; skill steers the vessel in the teeth of the gale; skill is triumphant in the chariot race." We cannot improve upon the mental attitude that is implied in these words; we can but make it our own. As for me, however much I may have failed to make it clear, I have endeavored to-night to keep steadily before me two essential points: the good of the country which has now sheltered me for over a quarter of a century, and the good of the University which has honored me with a seat on its Council. The first I believe to be chiefly dependent on energetic concentration of efforts towards greatly increased soil production; and success in this direction will, in my judgment, be very largely a factor of a judiciously conceived education system, with an inspiring rather than a levelling influence, and offering to all a fair start in the race of life. What I conceive to be the good of the University has been so admirably expressed by another that I make no apology for closing with the following quotation:—"The ideal University," says Brereton, "should be in the world, but not of it; a cloister to which all the world can come, which contains alike recluses and friars—recluses who pursue knowledge for its own sake, carrying their knowledge to the skies; and friars who carry it to the market place; a miniature of the world, or, rather, an ideal of the world, while the world should be the realization of the University."

MICE AND MOULDS.

THEIR RELATIONSHIP WITH PARALYSIS AND DEATH IN HORSES.

In the course of an address delivered before the members of the Murray Bridge Branch of the Agricultural Bureau, the Veterinary Lecturer (Mr. F. E. Place, B.Sc., M.R.A.S.E., B.V.Sc., M.R.C.V.S.) referred to the association of mice and moulds in hay and chaff, and the resultant sickness and death amongst horses.

It had been stated, the lecturer said, that earlier invasions of mice in South Australia had cleared off, but the question arose, did all the mice clear off? So far as he could ascertain, there was no definite answer to the query how long mice lived. That was of great economic importance, for upon the term of life depended the possibility of getting rid of them. It would be an act of national importance if observations could be made in the Nature study classes of the schools by keeping a few mice in cages, and noting their age from birth to death. Such statistics would not be infallible, because of the artificial conditions of living, but they would be of value. He had known white mice, kept as controls of experiments in feeding, live to three years; but those were exceptions, apparently, the general term being less than a year. Such cases, however, aroused the uncomfortable idea that under favorable conditions such as have existed this year, enough strong and hearty individuals would survive to produce another generation.

The Present Visitation of Mice.

"I have often heard it asked," he continued, "'How do you account for there being no young mice in this visitation? All we see are grown.'

"The answer lies in the latter part of the question; all we *see* are grown because nesting conditions are so ideal that young ones need never come to light till sufficiently big to fend for themselves.

"For my own part, I feel somewhat alarmed when I look back upon the few pairs of rabbits, the ancestors of the myriads of to-day, and then think of the numbers of lusty pairs of mice capable of reproducing their kind, I feel alarmed, not so much on account of our inability to cope with them, as because of our disinclination to exert ourselves. Several of the methods suggested for their destruction are quite satisfactory, such as the double fence, the catchpit tins, and so forth, because of the natural habit of the mice to come out at night and return to shelter before dawn. But vigilance must be exercised that no gangways are left, and a single straw will suffice for passage.

"It seems to me, however, that our happy-go-lucky way of throwing down dunnage and building our stacks without protection is inviting disaster. Remember the pride with which the farmer in the old country looked at his five-year-old stack, when private banks were not always reliable, and the envy of his less fortunate neighbors, who had to thresh out in the second winter. Every stack was built on a mouse-proof staddle or brandreth. Times were not good enough to run risks of having all the wheat destroyed. I am told that we cannot do that

here, but I cannot see why. Year after year the stacks are built in the same places on the wharf or in the station yard, and the provision of mouse-proof staging would soon be repaid in the wheat saved.

A Danger.

"Again, we do little because we hope Nature will wipe out the trouble, by mouse plague or some other deadly act. I can scarcely credit Nature building up a mouse population for the fun of wiping it out with ringworm or dysentery. According to her immutable law, the weakest will go to the wall, and in their fall drag down those around them, but her plan is still the survival of the fittest, and in that lies our danger. We have seen ancient kingdoms fall beneath the pricking of mosquitoes, and the multiplication of mice may mean to us a fight against disease and death. Already it has been hinted in a neighboring State that the germs of cerebro-spinal meningitis have been freely isolated from dead mice, and there is no reason why they should not, as the mouse is well known to be an experimental carrier of the disease.

"We ourselves see them daily victims of a loathsome skin disease, which we call mouse plague, that eats their substance, blinds them, and destroys them, and when we see a notice from the Board of Health that favus is a notifiable disease, we probably do not realise that human favus and mouse plague are one and the same disease. We know how handling infected material produces sores on ourselves, which we call mouse plague; but we do not always know that a mould, *Achorion schoenleinii,* is the common cause of both; just an ordinary mould, such as one scrapes off cheese, but growing so virulently on the young mouse's head that it entirely destroys tissues hard as bone, growing so well upon our arms that large, itching sores result. But why make such a fuss about a ringworm, some may say. Another man who has lost all his horses will say why do not scientists hurry up and show us why ringworm on a mouse's head is closely connected with the death of a paralysed horse.

Moulds.

"Another form of mould growth is well known to us to be dangerous, namely, mushrooms, and we all take care to pick them over and use only those we know to be safe; and yet, with all our care, a friend may eat some and be quite ill, while we do not feel any bad effects, for in them all is a poison, muscarin, deadly to some as snake venom, and harmless to others, as the same snake venom would be if swallowed. So that moulds do seem to have some practical bearing on the trouble that we shall soon consider for a few minutes, the paralytic deaths of horses. Experiments have been carried out with one class of mould which affects grain in Italy, *Monascus purpureus,* and sufficient evidence has been collected to show that it will produce paralytic symptoms both in man and beast, and the working of mice in stacks has a very practical bearing on the case with which many moulds will grow in haystacks, owing to the opening up of airways in the stacks and the deposit of moisture in the form of mouse urine.

"It is of practical importance to notice that old haystacks that had settled before the mice arrived open out quite sweet, while those that were open enough to allow them to traverse their interiors open out as muck.

"Often the question is put to me, 'Why do horses do better on smutty fodder than upon clean?' The reason why horses appear to do better on these moulds is that all of them generate poisons, which stimulate the liver, and when it is stimulated, then the system seems to do well. Nature has a splendid safeguard in all animals, namely, that food in the intestinal tract is not inside the animal, from a utility point of view, until it has passed through the layer of cells which lines that tract, and as long as they are intact it is a difficult matter to poison. Experimentally, large doses of poison have been confined in the horse's stomach and no absorption has taken place; but once it has been allowed to pass into the bowels death has occurred in a few hours. This has been done with mineral poisons, like arsenic; but the poisons contained in moulds are more complicated, and frequently are quite harmless till they come in contact with some digestive juice or some gas eliminated in the process of digestion, when suddenly they split up into most virulent poisons, which, being absorbed in the blood stream, affect the brain and spinal cord. Many vegetable substances are known to do this—for instance, growing sorghum, the poison known as wourali, and so forth.

The Effects of Worms.

"Unfortunately for the horse, the lining of his digestive tract is not always intact. In the early part of his stomach worms, *Habronema equi*, form abscesses; near the exit bots the larvae of *Gastrophilus equi* make numerous minute punctures; in the small bowels the long round worms, *Ascaris megalocephala*, are constantly utilising the food for their own purposes and passing it out as dung, which contains an irritant poison, ascarin; while, in the large bowels, both the thousands of small blood worms, *Sclerostoma tetracanthum*, and the hundreds of large blood worms, *Sclerostoma equinum*, are not only utilising the blood in the same way, but are actually piercing the lining and coats of the bowels in myriads of places, and it is when they are doing this that the poisoning cases are most frequently reported.

"The muck so frequently fed to horses under the name of chaff contains not only poisonous moulds already mentioned, but has another marked disadvantage, namely, that it is much harder of digestion than good-quality stuff, and often uses up more energy in the endeavor to extract nutriment from it than might accrue from its use apparently.

"So it would appear that the paralytic poisoning, about which one hears so much nowadays, is due to a combination of factors, which stand to one another in the following relationship and order of importance. First, there is a gradually lowering of the horse's resistive power brought about by work, climatic conditions, and especially by inferior and infected food, which, on account of its inferiority, fails to build up worn-out tissues, and by its mouldiness actually poisons. Secondly, this inferiority is due to a great extent to the working of mice, who actually infect it with dangerous moulds, and bring about conditions favorable to the growth of others, and damage and destroy its feeding properties. Thirdly, the damage done to the coats of the stomach and intestines by parasites such as bots and worms forms a ready way for the poisons to reach the blood stream, while the virulence of such poisonous action is increased by the secretion of very virulent

poisons by the parasites themselves, such as oestrotoxin by bots in quantity, ascariu and similar ones by worms.

TREATMENT.

"If we accept this line of reasoning, we must see that prevention is what me must aim at rather than treatment. The symptoms are fairly well known to most horse owners, and generally several horses are attacked simultaneously. The affected animal drivels at the mouth, and has a difficulty in swallowing; he sways in the hindquarters, and has little control of his movements; the fetlocks knuckle over; a few hours later he cannot rise, though he can move about if helped up, and the tongue hangs out; appetite and dung and urine are normal, though the last may be retained when the animal remains down for many hours.

"Treatment is unsatisfactory, because the disease is progressive; but the following lines have met with as much success as most:—Sling, but in doing so do not hang up like a golden fleece—only support with the body cloth, so that the animal can use its feet and sit down in the breeching, if desired. A crush pen, with a pole behind to sit on, and the body cloth stretched between its sides, is more satisfactory than a hanging sling; but if the latter has to be used, spread the side bars by a swingletree.

"Give a good purgative, such as a six dram aloes ball, and if the appetite continues, a tablespoon of Fowler's solution of arsenic two or three times a day, and a teaspoon of sulphate of quinine two or three times a day. If food is not taken then, these should be made into a ball with pollard and molasses and put into the mouth, or, better, down the throat. The arsenic and quinine may have to be continued for several weeks, and if such is the case, another physic ball should be given in the third week. As recovery sets in the arsenic and quinine may be gradually reduced, and their place taken by 20 drops of tr. nux vomica. The loins, leg, and neck should be frequently and well rubbed by hand or with a mild liniment, and whenever possible, exercise should be given at least twice a day. When bowels and bladder are irregular, they must be emptied from time to time, and an ounce of photographer's hypo in the drinking water morning and evening on alternate days will assist in keeping them right.

PREVENTION.

"Prevention is simple. It consists in avoiding the combination of factors that result in the disease, and I know several farms in the North, right in the heart of districts where horses are being lost wholesale, that escape scot free because the farmers are horse masters, and in that fact lies the key to the whole situation. Unless a man will apply the rudiments of horse mastership he must put up with losses; and the rudiments required are steady regular work, regular feeding and watering with good-quality feed sufficient for the working conditions, varied by the addition of oats, barley, or bran, or, better, a mixture of the three.

"If coats are rough, and the horses out of sorts, a hot bran mash and a five-dram physic ball on the Saturday night, and a little sulphur, say, a dessertspoon in the feed once a day as a regular thing for a

week or so. If bots or worms are known to exist, treat them as suggested in the Agricultural Department's leaflets on 'Bots' and 'Blood worms.'

"With regard to mice, horses are not carnivorous, and they would much appreciate having the mice shaken out of the hay before it is passed through the chaffcutter, even if such a proceeding does entail a little more trouble; it is worth it, in any case, for it diminishes risk of disease, and one horse is worth many mice.

"I have several times lately pointed out that the use of infected hay is a very risky proceeding, and by practically every post I get inquiries as to how it should be treated. I feel very much inclined to run off a thousand copies or so, and say 'By a firestick'; but such sound advice is looked upon as lacking in courtesy, and I have to send a makeshift instead. Sun and fresh air will do a great deal to minimise the effects of the mice and the moulds, and hay should be opened out and spread before cutting for a few hours. Salt at the rate of 5lbs. to 7lbs. per ton, or sulphur at a little less, will also help to ward off trouble: but from observations I have been making for the last few months, I am inclined to think that slaked lime, at the rate of 20lbs. per ton, is the best; not only does it shrivel the moulds, but it is objectionable to the worms, and is slightly tonic and digestive for the horse. I notice that a similar dressing has been recently advocated in the case of spoiled wheat, thus supporting my own view. But none of these palliatives is as good as the avoidance of the muck, which is really quiet unfit for horse feed, and which is at the bottom of the mischief in most cases."

BALAKLAVA WHEAT COMPETITION, SEASON 1916-17.

By G. H. Stevens, Manager Government Farm, Turretfield.

The six years' competition arranged by the Balaklava Agricultural Bureau has now run half its course, the number of competitors for the past season having been eight.

The following table shows the results for the 1916-1917 season :—

Competitor.	Variety.	Yield per Acre.	Yield. Max. 75 Points.	Purity of Seed and Type. Max. 10 Points.	Milling Qualities. Max. 10 Points.
		Bush. lbs.			
H. H. Goldney ..	Marshall's No. 3 .	33 24	72·9	—	5·5
P. H. Roediger ..	King's White ...	33 56	74·0	—	4·0
R. S. Goldney ...	King's Red	33 0	72·0	—	4·5
H. C. McPharlin .	Gluyas.....	33 20	72·7	—	3·75
F. W. Wagner ..	Silver King.....	30 56	67·5	—	5·25
F. W. Wagner ..	Golden King	29 52	65·2	—	6·0
P. H. Roediger ..	Silver King.....	29 12	63·7	—	6·0
H. W. Goldney ..	Lotts	29 20	64·0	—	5·0

The Results for the 1916-1917 Season—*continued.*

Competitor	Variety.	Weight per Bushel.	Max. 5 Points.	Total Points. Max. 100.
		Lbs.		
H. H. Goldney.....	Marshall's No. 3	61¼	1·5	79·9
P. H. Roediger	King's White	60	0·5	78·5
R. S. Goldney	King's Red	61	1·0	77·5
H. C. McPharlin	Gluyas.....	58¾	—	76·45
F. W. Wagner	Silver King.....	60¾	0·75	73·5
F. W. Wagner	Golden King	61½	1·5	72·7
P. H. Roediger	Silver King.....	62¼	2·25	71·95
H. W. Goldney	Lotts	60	0·5	69·5

It will be noted that no points have been awarded under the heading of "Purity of Seed and Type." In past years it has been the practice for me to inspect the plots before harvesting, and on my notes taken during such inspection I awarded these points. Last year, however, owing to competitors failing to advise the secretary in time that the plots were nearing the inspection stage my visit could not be arranged, and the plots were harvested without an inspection. In this respect, therefore, all the plots are placed on an equal footing this year.

The yields in all cases are good, and would, in all probability, have shown up still better had some of the grain not have been lost through the crops going down.

The bushel weight is, on the other hand, uniformly low, only one of the samples being up to the f.a.q. standard, which was fixed at 62lbs. for the present season. The bad harvesting weather which prevailed throughout the State has, probably, had an influence on the weight of the grain. The total number of points gained is not so high as in previous seasons. Firstly, because the points for purity of seed and type have had to be omitted, and, secondly, because the samples have not scored well under the headings of milling qualities and weight per bushel.

The following is the position of the eight competitors who continued in the competition during the third year. The number of points given is the total gained for the three years:—

Competitor.	Variety.	Total Points.
P. H. Roediger	King's White	198·85
H. C. McPharlin	Gluyas.....	192·5
F. W. Wagner	Golden King	189·45
R. S. Goldney	King's Red	189·3
H. H. Goldney	Marshall's No. 3	167·55
P. H. Roediger	Silver King.....	156·75
F. W. Wagner	Silver King.....	146·1
H. W. Goldney	Lotts	142·05

EXPERIMENTAL FARM HARVEST REPORTS.

By W. J. Spafford, Superintendent Experimental Work.

4.—KYBYBOLITE EXPERIMENTAL FARM.

Manager: Mr. L. S. Davie.

This farm is situated in the hundred of Binnum, in the South-East of the State, and contains about 1,000 acres of land immediately surrounding the old Kybybolite sheep station. The land is more or less undulating, and is all arable; the great bulk of it contains a very large proportion of ironstone rubble with its corresponding crop-raising difficulties, whilst the remaining portion is heavy-working "crabhole" land.

The Season 1916.

The year started off with over 1¼in. of rain in January, as against the farm average of less than ½in. for this month; but the next four months produced rain in quantities that favored seeding operations. This farm is only gently undulating, and the soils are fine-grained, so that they become water-logged very soon, and when the autumn rains are heavy much difficulty is experienced with the putting in of the seed. February and March together only produced 31 points of rain, while the average for the farm for that period is 2¼in.; but April gave a little over 2in., which fell in small quantities only, and so did not hamper the working of the land. May also was a comparatively dry month, so that taken as a whole the seeding season was very much better than is usually experienced at the farm. June and July were about average winter months as regards the rain that fell, and they were followed by good spring months and exceptionally plentiful November rains. The whole season favored rank growth wherever the land is at all well drained, and on such spots heavy yields were obtained, but there is still much land on the farm that is in need of draining in some form or other, and until this is completed the average yield of the various crops grown will not be high. The experience on the farm in most years can be summed up as some really good crops, some fair, and some very poor, and the correcting of this state of affairs seems to be bound up with drainage. The table below sets out in detail the monthly rainfall at the farm for last season together with the average for the last 11 years:—

Rainfall Distribution at Kybybolite, 1906-1916.

	Means, 1906-1910.	1911.	1912.	1913.	1914.	1915.	1916.	Means, 1906-1916.
	In.	In.	In.	In.	In.	In.	In.	In.
January	0·29	0·71	—	0·30	0·72	0·54	1·29	0·46
February	0·69	2·61	0·14	1·77	0·15	1·15	0·28	0·87
March	2·10	0·85	0·72	1·38	1·37	0·42	0·03	1·39
April	1·70	1·11	1·51	0·80	1·98	1·12	2·07	1·55
May	3·45	2·53	0·83	0·83	1·98	1·82	0·69	2·36
June	3·49	3·75	2·64	0·32	0·65	6·55	3·56	3·17
July	4·15	2·68	2·54	1·94	1·69	1·68	2·68	3·09
August	3·05	2·08	1·81	3·08	0·33	4·11	2·94	2·69
September	2·85	1·78	5·83	3·03	0·47	4·18	2·77	2·94
October	2·56	0·79	1·10	1·95	0·18	1·20	2·20	1·84
November	1·97	—	1·97	1·98	1·15	0·52	3·28	1·71
December	0·94	3·34	1·74	1·06	1·27	0·01	1·74	1·26
Total rainfall	27·24	22·23	20·83	18·44	11·94	23·30	23·53	23·32
Total "Useful" rain (April-November)	23·22	14·72	18·23	13·93	8·43	21·18	20·19	19·34

Distribution of "Useful" Rainfall.

The next table will show the rainfall which plays the greatest part towards producing crops, and which we class as "useful" rainfall. In this it will be seen that the seeding rains were much below the average—a great advantage in this district, as has already been pointed out; both the winter and spring rains were very nearly average, and that the early summer rains were exceptionally heavy.

Distribution of "Useful" Rain in 1916, *comparatively with the Means from* 1906 *to* 1916.

	1916.	Means, 1906-1916.
	In.	In.
Seeding rains (April-May)	2.76	3.91
Winter rains (June-July)	6.24	6.26
Spring rains (August-October)	7.91	7.47
Early summer rains (November)	3.28	1.71
Total "Useful" rains	20.19	19.34

Crops.

Although the soil conditions at this farm are not good, it is blessed with a sure and fairly plentiful rainfall, and the general climatic conditions are such that a very varied assortment of crops is possible, and so a fair variety is tried every season.

Green Forage Crops.

This district naturally produces its green feed in the spring, and so it becomes necessary to supplement this with autumn and winter feeds, and with this object in view a fair area of land is prepared early in the year and seeded with the cereals oats, rye, and barley,

usually as mixtures of them. This season three fields were prepared and seeded with the above-mentioned cereals for green feed for live-stock. Field No. 10, about six acres in area, was ploughed on April 5-6 and sown with 80lbs. rye and 60lbs. Algerian oats to the acre on April 15, with 1cwt. of superphosphate. This field is rather lowlying, but it produced an abundance of feed, which continued well on in the year. Field No. 19, containing about 40 acres, was ploughed from April 11th to 19th, and then dressed with 1cwt. superphosphate to the acre; 32 acres were sown with a mixture of 60lbs. rye and 80lbs. Algerian oats, and the remaining eight acres with 85lbs. Cape barley to the acre. The season was so favorable to growth that practically anything would do well, and this crop was really good throughout the crop-growing period. Field No. 20, of about 28 acres, was ploughed from April 6th to April 10th, and was seeded with 60lbs. rye and 80lbs. Algerian oats and 1cwt. superphosphate to the acre on April 17-20. This crop was fed down by livestock until the middle of August, when it was shut up for hay, and produced from 28.22 acres 16 tons 4cwts. of hay for an average of 11cwts. 54lbs. to the acre.

Hay Crops.

Fields Nos. 5 and 6 (not yet subdivided) were the only ones in which crops were sown solely for hay. This block carried wheat crops in 1915, and was ploughed up between April 25th and May 25th this year, and was seeded as follows:—From May 4th to 27th six acres were sown at the rate of 80lbs. per acre, and 42 acres with 64lbs. per acre of Algerian oats and 1cwt. superphosphate. The balance of the block—about 10 acres— was sown with Culcutta oats at the rate of 64lbs. and 1 cwt. superphosphate to the acre on May 23rd and 24th. The whole block was harrowed both before and after the drill. Besides the above, more or less wide headlands were cut in all the fields carrying cereals, and the returns from the various lots are shown in the following table:—

Hay Yields, Kybybolite, 1916.

Crop. Field grown.	Area.	Total Yield.			Yield per Acre.		
	Acres.	T.	C.	L.	T.	C.	L.
Algerian oats (Nos. 5 & 6)	38.31	69	8	84	1	16	28
Calcutta oats (Nos. 5 & 6)	12.40	22	7	28	1	16	8
Algerian oats, lime test (Nos. 5 & 6)	6.98	10	7	28	1	9	78
Oat headlands (No. 2)	2.59	7	11	56	2	18	55
Oat headlands (No. 17)	3.57	4	1	84	1	2	101
Wheat headlands (No. 15)	7.89	13	11	84	1	14	50
Wheat headlands (No. 3)	5.61	7	12	84	1	7	26
Farm average	77.35	135	1	0	1	14	102

The farm average for hay is considerably above the average for the farm for the period 1910-1916, and has only been exceeded on

one occasion in that time. The next table gives the hay returns at Kybybolite since 1910:—

Hay Returns, Kybybolite, 1910-1916.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
1910	28.35	21.08	106.13	88	19	28	0	16	85
1911	22.23	14.72	94.04	136	6	110	1	9	28
1912	20.83	18.23	26.59	67	7	70	2	10	76
1913	18.44	13.93	108.55	166	11	0	1	10	77
1914	11.94	8.43	109.00	90	1	0	0	16	59
1915	23.30	21.18	108.66	111	14	56	1	0	65
1916	23.53	20.19	77.35	135	1	0	1	14	102
Means	21.23	16.82	—	—			1	8	54

Oat Crops.—A fair collection of varieties of oats was sown this year in field No. 2; of the 11 varieties sown here only one variety—and that because the block was fairly large—could be harvested by itself, the others made such tall, rank growth, that they all lodged very badly, and only being long narrow blocks, when they went down they matted together so badly that it was impossible to harvest them separately. Indeed they lodged so badly that when harvested they only yielded 6bush. to the acre. Field No. 2 was sown to fodder crops in the autumn of 1915, and was prepared and sown to summer crops in the spring; these latter did not germinate, so the land was kept worked for oats. The land was cultivated on May 2nd, and from the 2nd to the 4th was sown with the varieties mentioned above and about 13½ acres of Calcutta oats with 1cwt. superphosphate and 60lbs. seed to the acre. Field No. 17 was also sown with oats for grain. This carried a crop of oats in 1913, and had been left out as pasture from then until November, 1915, when it was ploughed. The block was cultivated from November 23rd to 29th, and again from April 27th to 30th, and was sown with oats from April 29th to May 10th, the bulk plots receiving 1cwt. superphosphate and 60lbs. seed to the acre. The yields from these fields will be seen in the table below; in the table are also shown the yields of some experimental blocks, details of which are given later:—

Oat Variety Yields, Kybybolite, 1916.

Variety.	Field Grown No.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
Calcutta	2	11.54	309	13	26	32
Algerian	17	9.67	170	12	17	4
Calcutta	17	3.70	50	36	13	30
Calcutta, Sel. 1	2	1.16	8	3	6	38
Varieties (mixed)	2	0.88	5	13	6	2
Algerian (Exp.)	17	4.07	82	5	20	7
Algerian (Exp.)	—	5.20	156	27	30	5
Algerian (Exp.)	—	25.72	606	10	23	23
Farm average		61.94	1,388	39	22	17

The farm average shown, although not high, is some bushels better than the average obtained from oats since 1910 at this farm, and has, like the hay, only been exceeded on one occasion. The general farm average since 1910, as well as the average for each year, will be seen in the next table:—

Oat Returns, Kybybolite, 1910-1916.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
1910	28.35	21.08	77.00	1,001	0	13	0
1911	22.23	14.72	60.91	828	13	13	24
1912	20.83	18.23	103.00	3,450	36	33	20
1913	18.44	13.98	94.55	1,460	10	15	18
1914	11.94	8.43	6.00	61	3	10	7
1915	23.30	21.18	79.74	1,251	25	15	28
1916	23.53	20.19	61.94	1,388	39	22	17
Means ..	21.23	16.82	—	—		17	28

Barley Crops.—Barley is a very disappointing crop at this farm, and on one occasion only has it given anything like a fair yield. The climatic conditions are really good for this crop, but the only places that produce good yields are those that are really well drained. Field No. 13 carried oats in 1915, and was ploughed from June 1st to 9th, when it was in good condition. From June 12th to 14th about 19 acres were seeded to barley at the rate of 65lbs. seed and 1cwt. superphosphate to the acre; this went in well and the germination was all that could be desired; but the field is rather lowlying and when the heavy rains came the barley crop suffered so much that it finished by only yielding 3bush. 44lbs. to the acre. Field No. 17 carried an oat crop in 1913, and was left as pasture until November, 1915, when it was ploughed. From May 1st to 7th about 28 acres of this field were drilled in with barleys at the rate of 65lbs. seed with 1cwt. superphosphate to the acre; it produced a better crop than did field No. 13, but still was very poor. The table following shows the yields obtained from the various plots:—

Barley Variety Yields, Kybybolite, 1916.

Variety.	Field Grown. No.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
Short Head	17	10.12	100	45	9	49
Duckbill	17	1.69	15	0	8	44
Prior	17	1.72	12	41	7	23
Oregon	17	11.41	73	44	6	24
Cape	13	18.30	71	7	3	44
Farm average		43.24	273	37	6	17

The table below gives yields of barley obtained at Kybybolite since 1910, with the farm average for the period:—

Barley Returns, Kybybolite, 1910-1916.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1910	28.35	21.08	45.39	259 29	6 30
1911	22.23	14.72	58.76	552 16	9 20
1912	20.83	18.23	50.00	1,500 0	30 0
1913	18.44	13.93	35.00	527 0	15 3
1914	11.94	8.43	3.02	37 48	12 29
1915	23.30	21.18	50.28	789 39	15 35
1916	23.53	20.19	43.24	273 37	6 17
Means ..	21.23	16.82	—	—	13 31

Rye Crops.—Some rye is always grown on the farm, as there is a small demand for seed. We always use rye in our green forage mixtures, and raise our own seed for the purpose, and we grow a little to always have some good thatching straw on hand. Details of this year's results are to be found below:—

Rye Variety Yields, Kybybolite, 1916.

Variety.	Field Grown. No.	Area. Acres.	Total Yield. Bush lbs.	Yield per Acre. Bush. lbs.
Giant Winter	15	0.63	8 3	12 40
Schlanstedt	15	0.81	8 13	10 10
Multicaule	15	0.76	6 40	8 47
Rye	13	6.00	11 47	2 0
Farm average	—	8.20	35 3	4 14

In the following table will be seen the yields of rye obtained at Kybybolite during the past two years:—

Rye Returns, Kybybolite, 1915-1916.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush lbs.	Yield per Acre. Bush. lbs.
1914	11.94	8.43	6.00	90 16	15 3
1915	23.30	21.18	7.27	57 44	7 48
1916	23.53	20.19	8.20	35 3	4 14
Means ..	19.59	16.60	—	—	9 5

Wheat Crops.—A large collection of wheat varieties was again grown at this farm, and as is always the case, the only block of any size of one variety is that carrying the manurial plots. As has been pointed out on former occasions this is more or less inevitable in a farm situated as is this one, and will continue so until the conditions are understood.

Field No. 3 was put in with kale in 1913, and was left until the spring of 1915, when it was ploughed, cultivated, and seeded to sorghum and millet. These crops were a total failure, and so the land

was kept worked in preparation for a wheat crop. From May 24th to 26th the whole block was cultivated, and from the 29th to June 1st was sown with 13 varieties of wheat at 80lbs. to the acre with 1cwt. superphosphate. Field No. 15 carried one half wheat and one half oats in 1914, and was ploughed from August 10th to 27th, cultivated November 8th to 23rd and May 9th to 19th, and harrowed immediately after the drill. From May 18th to June 10th wheat varieties were drilled in with 1cwt. superphosphate to the acre. The field went in well, and some of the small plots which were situated on a well drained part of the field produced really high yields, and indeed the whole field was satisfactory. The next table sets out in detail the returns from all varieties grown in the two above fields:—

Wheat Variety Yields, Kybybolite, 1916.

Variety.	Field Grown No.	Area. Acres.	Total Yield. Bush lbs.	Yield per Acre. Bush. lbs.
Federation, Sel. 3	15	0.03	1 24	46 40
Queen Fan, Sel. 3	15	0.04	1 34	39 10
Yandilla King, Sel. 3	15	0.20	7 10	35 50
Lott's, Sel. 3	15	0.33	11 14	34 2
White Tuscan, Sel. 3	15	0.37	12 25	33 34
White Essex, Sel. 3	15	0.33	10 48	32 44
Zealand Blue, Sel. 3	15	0.28	8 46	31 19
Golden Chaff	15	0.97	30 14	31 10
Basil	15	2.00	58 55	29 27
Bordier, Sel. 3	15	0.17	5 7	29 6
King Fan	15	2.85	79 35	27 55
Federation	15	3.48	92 29	26 35
Marquis	15	0.88	23 4	26 13
Marshall's No. 3, Sel. 3	15	0.09	2 20	25 56
Yandilla King	3	1.24	31 45	25 36
Zealand Blue	15	0.51	12 29	24 29
White Tuscan	15	11.94	290 19	24 19
Marshall's No. 3	15	3.09	66 26	21 30
Russian White	15	0.33	6 59	21 10
Marshall's No. 3, Sel. 1	3	0.91	19 12	21 6
Queen Fan	15	4.36	91 33	21 0
White Essex	15	4.17	84 32	20 16
White Essex	3	2.52	50 42	20 7
White Tuscan	3	1.43	28 15	19 45
Jade, Sel. 1	3	1.35	23 14	17 13
Silver King, Sel. 2	3	2.53	42 9	16 40
Brindle	15	0.82	13 20	16 16
Federation, Sel. 1	3	4.35	66 35	15 18
Caliph	15	3.07	46 9	15 2
Bordier	3	0.95	13 24	14 6
Fan, Sel. 1	3	1.53	16 35	10 50
Lott's, Sel. 1	3	0.84	8 48	10 29
Majestic, Sel. 1	3	0.86	6 55	8 3
King's Red, Sel. 1	3	1.89	13 8	6 57
Queen Fan (Exp.)	—	6.54	139 47	21 22
Queen Fan (Exp.)	—	25.10	299 17	11 55
Federation (Exp.)	—	6.40	158 41	24 48
Farm average	—	98.75	1,875 19	18 59

The yields seen in the above table plainly show why the farm average is not higher—such a collection of varieties, many of which must prove unsuitable to the district, give very little chance of getting a high average. The yield is some 3bush. above the general average for the farm, but it has been exceeded in two seasons since 1910. Below will be found in table form the returns for each year since 1910 with the general farm average:—

Wheat Returns, Kybybolite, 1910-1916.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1910	28.35	21.08	15.00	79 43	5 19
1911	22.23	14.72	17.15	232 45	13 34
1912	20.83	18.23	81.91	1,876 35	22 54
1913	18.44	13.93	48.20	1,288 56	26 44
1914	11.94	8.43	22.17	238 32	10 46
1915	23.30	21.18	79.64	882 31	11 5
1916	23.53	20.19	98.75	1,875 19	18 59
Means ..	21.23	16.82	—	—	15 37

The individual yields have been kept at the farm of the varieties grown each year, and the table below setting out the principal ones grown for the last five years, together with a few of the more recent introductions may prove of interest:—

Yields of Wheat Varieties, Kybybolite, 1912-1916.

Variety.	1912.	1913.	1914.	1915.	1916.	Means, 1912-1916.	Means. 1914-1916.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
White Tuscan	25 20	31 25	18 6	11 16	24 5	22 2	17 49
White Essex	27 32	24 41	21 49	9 17	20 48	20 49	17 18
Federation	33 29	23 16	12 30	12 13	20 25	20 23	15 3
Yandilla King	28 16	30 47	Failure	6 13	27 2	18 28	11 5
Marshall's No. 3 ...	24 45	29 33	Failure	8 47	21 30	16 55	10 6
Lott's	30 20	31 33	Failure	3 53	17 7	16 35	7 0
Bordier	25 34	25 21	Failure	8 28	16 32	15 11	8 20
Majestic	26 16	23 16	Failure	6 31	8 3	12 49	4 51
Queen Fan	—	—	18 43	17 43	21 10	—	18 52
King Fan	—	—	10 26	15 59	27 55	—	18 7
Zealand Blue	—	—	1 4	6 52	26 54	—	11 37
Fan	—	29 41	Failure	5 33	10 50	—	5 28
Golden Chaff	—	—	—	10 6	31 10	—	—
Marquis	—	—	—	11 10	26 13	—	—
Basil	—	—	—	6 26	29 27	—	—
Russian White	—	—	—	2 55	21 10	—	—
Jade	—	—	—	5 28	17 13	—	—
Brindle	—	—	—	5 17	16 16	—	—
King's Red	—	—	—	7 53	6 57	—	—
Farm averages .	22 54	26 44	10 46	11 5	18 59	18 6	13 37
	In.	In.	In.	In.	In.	In.	In.
Total rainfall	20·83	18·44	11·94	23·30	23·53	19·61	19·59
"Useful" rainfall ..	18·23	13·93	8·43	21·18	20·19	16·39	16·60

The above table shows for the year under review the following varieties growing on blocks over half an acre in extent that have produced more than 20bush. to the acre. Golden Chaff is a wheat almost unknown in this State, and the original seed was introduced by Mr. H. Clutterbuck from Canada on his return from that country. Basil is a wheat that was bred at Roseworthy Agricultural College, and one that has been doing fairly well lately. King Fan is also a Roseworthy College wheat that has done consistently well at Kybybolite. Yandilla King is a wonderfully hardy wheat known all over this State. Zealand Blue is the original Western Australian Crossbred 53, and has done well in the Adelaide Hills ever since brought to this State, and more recently gives promise of suiting the South-East. Marquis is a Canadian wheat that has been given much prominence of late, and it promises to be useful in parts of South Australia. White Tuscan is a good wheat where the springs are cool and damp, and is a tip-top hay wheat. Marshall's No. 3 is a well known hardy general purpose wheat. Queen Fan is a Roseworthy Agricultural College wheat that has been doing consistently well in a variety of conditions. White Essex is very similar to White Tuscan, and needs the same conditions to do its best. Federation is well known all over Australia.

For the five-year period, 1912-1916, only four varieties yielded above the farm average for the same period, and they are in their order of yielding, White Tuscan, White Essex, Federation, and Yandilla King. Over the period, 1914-1916, the only varieties, in their order of production, that have exceeded the farm average for the same time are:—Queen Fan, King Fan, White Tuscan, White Essex, and Federation.

Miscellaneous Cropping.

As well as the cereals, many other crops were grown at this farm, all behaving in a similar manner to the cereals, namely, some patches good where the land is well drained, and contains a fair amount of organic matter, some parts fair, and some really poor. So far the only crop that does more or less consistently well on all classes of soil at Kybybolite is Thousand Headed Kale, and this crop has done really well every year.

Peas.—This crop is always more or less successful at the farm, and this year a fair area was put in. Field No. 12 carried a crop of Cape Barley in 1915, was ploughed from June 9th to 21st, and was harrowed before and after the drill. On June 12th to 15th about 19 acres were drilled in with 100lbs. Early Dun field peas and 1cwt. superphosphate to the acre, and on June 15th to 16th about 15 acres were drilled in with 100lbs. Egyptian peas and 1cwt. superphosphate

to the acre. Both these blocks germinated well, but were checked when the cold and wet weather arrived. The Early Dun variety recovered before the Egyptian from this check, but when the really warm weather had set in there was little difference between the two kinds as regards general appearance. The following table shows the results from these peas:—

Pea Variety Yields, Kybybolite, 1916.

Variety.	Area. Acres.	Total Grain. Bush. lbs.	Grain per Acre Bush. lbs.
Early Dun	18.50	296 49	16 3
Egyptian	15.14	201 45	13 20
Farm average	33.54	498 34	14 52

Beans.—For the first time Tick Beans were tried in the field in a fairly large block. In field No. 12, which carried the peas, about 11 acres were sown with Tick Beans at the rate of 60lbs. to the acre with 1cwt. superphosphate. Some few patches in this crop did really well, making good growth and podding up very nicely, but the most of the block was very wet, and made very poor growth. The block, 10.96 acres, produced only 25bush. 20lbs. of clean seed, or an average of 2bush. 19lbs. to the acre.

Linseed.—A small block of linseed was tried in field No. 2. This germinated rather poorly, and so the thin crop had a great struggle with the weeds; the individual plants made good growth and produced good crops of pods well filled with good seed, but the yield from the plot was very low. The 1.57 acres harvested only produced 104lbs. of clean seed, or an average of 1bush. 16lbs. to the acre.

Kale.—Field No. 19, which carried a green forage crop in the early part of the year, was ploughed in the spring and worked down for kale. The whole field of about 50 acres was seeded to Thousand-Headed kale, which germinated well, and has made really tip-top growth.

Buckwheat.—Field No. 11 was cultivated in the early spring and sown with 2bush. of buckwheat to the acre for green feed. The crop germinated well and made very fast growth; but it finished growing too soon, and did not make a bulky crop. This was rather disappointing, because in 1915, with practically no rain after planting, it gave great promise of being a useful rapid-growing summer feed.

Summer Crops.—Field No. 16 was ploughed after seeding, prepared for summer crops, and was sown to the following:—Sorghum, 30 acres; millet, 7 acres; maize, 5 acres; silver beet, 5 acres; mangels, 2 acres; turnips, 2 acres; swedes, 2 acres; Sudan grass, 1 acre.

Sorghum.—This crop germinated very well, but the continued wet weather kept the land more or less waterlogged, and so the crop did not make much growth in its early stages; but by the end of January the patches that were not swamped out made very fair growth, and on the whole the block was fair.

Millet.—The millet crop came away well, as it was hardly hindered at all by the wet conditions, and the resulting crop was very fair.

Maize.—The maize crop was on a comparatively dry side of the field, and so was not bothered by excess of moisture. It made good headway in the early stages, but did not result in anything more than a fair crop, because the warm weather was too long delayed and the plants had practically finished growing when the warmth, necessary for strong growth with this class of crop, had set in.

Silver Beet.—This crop germinated well, but as in the case of the sorghum the continued wet weather retarded its growth. The waterlogged patches became overrun with sorrel, which choked out the beet plants; but away from these patches the crop was good.

Mangels.—The mangels were in the same conditions as the beet, and suffered in the same way. The clean patches recovered with the approach of warm weather and rooted up fairly well.

Turnips.—These started very well, and gave promise of good results, which, however, were not fulfilled. Caterpillars devoured the plants right to the ground, and the plants recovered from this only to be again taken off by "blight." A good healthy third growth was made, which was spoiled and dried up by a severe attack of the Rutherglen fly. After all these attacks, which lasted into February, the plants recovered and produced quite a fair crop of roots, which were readily eaten by the sheep.

Swedes.—This crop went through the same troubles as did the turnips, and like them recovered late in the year and produced quite a lot of feed.

Sudan Grass.—This crop behaved like the sorghum, *i.e.*, started well, was more or less drowned in patches, and finally on the approach of warm weather made a wonderful recovery. The good patches in this block produced really good heads of seed, so portion was fenced off from stock and harvested to supply our requirements for this season.

Maize for Grain.—A series of small plots to test the behavior of maize under irrigation were put down, and the plants were allowed to ripen their seed. Despite the fact that the season was remarkably cool and damp these plots all produced good cobs, which were very well filled with good plump seed.

Experimental Plots.

In 1912 a set of permanent experimental plots was laid down, and since that time three further series have been commenced. Details of the results from these plots will be found in the tables following.

Permanent Cultivation Plots with Oats, Kybybolite.

These plots, set out to discover the advantages, if any, of bare fallow, the time to plough, the time to cultivate, and the number of times to cultivate, were surveyed and cultivated in 1912, and carried their first crops in 1913, so that with this season we now have the results of four years. The table below shows the averages of the results obtained over the whole period, 1913-1916, for grain, and since 1914 for the total produce:—

Permanent Cultivation Plots with Oats at Kybybolite.—Means of Results for Period, 1913-1916.

1cwt. superphosphate to the acre used each year.

Plots.	Treatment.	Total Produce. per Acre* T.	C.	L.	Grain per Acre. Bush.	lbs.
2 & 3	Alternate cropping, without fallow	0	18	105	18	6
4 & 5	Autumn ploughed	1	6	89†	26	17*
6 & 7	Autumn ploughed, Spring cultivated	1	0	46	22	31
8 & 9	Autumn ploughed, Spring cultivated, Summer cultivated	0	19	25	24	8
10 & 11	Winter ploughed	1	3	39	24	2
12 & 13	Winter ploughed, Spring cultivated	1	5	67	26	19
14 & 15	Winter ploughed, Spring cultivated, Summer cultivated	1	5	84	29	13
16 & 17	Spring ploughed	1	4	37	23	22
18 & 19	Spring ploughed, Spring cultivated	1	4	76	30	17
20 & 21	Spring ploughed, Spring cultivated, Summer cultivated	1	9	15	29	38
22 & 23	Summer ploughed	0	19	56	22	19
24 & 25	Summer ploughed, Summer cultivated	0	16	25	18	18
26	Annual cropping	0	15	42	16	20

* 3 years only. † 2 years only.

Ploughing.—Autumn, April-May; Winter, June-July; Spring, September; Summer, November.

Cultivation.—Spring, September, October; Summer, November.

The above table hardly shows the effects of the various cultivations in the various seasons, but the next two tables will illustrate these in detail.

Details of Grain Yields from Kybybolite Permanent Cultivation Plots with Oats, 1913-1916.

Plots.	1913.	1914.	1915.	1916.	Means.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush lbs.
2 & 3	26 37	8 31	9 25	27 13	18 6
4 & 5	23 37	—	22 38	32 16	*26 17
6 & 7	28 0	10 18	22 39	29 28	22 31
8 & 9	33 1	10 18	22 28	30 26	24 8
10 & 11	32 34	9 16	22 25	31 12	24 2
12 & 13	39 11	10 4	24 1	32 20	26 19
14 & 15	46 29	13 18	23 37	33 7	29 13
16 & 17	35 18	8 24	19 10	30 37	23 22
18 & 19	53 5	12 27	23 7	32 31	30 17
20 & 21	48 8	17 0	21 10	33 14	29 38
22 & 23	37 26	10 13	16 2	25 37	22 19
24 & 25	33 21	8 11	9 13	22 29	18 18
26	32 30	2 27	1 34	28 31	16 20
Farm average for oats	15 18	10 7	15 28	22 17	15 37
Total rainfall	18.44in.	11.94in.	23.30in.	23.53in.	19.30in.
"Useful" rainfall	13.93in.	8.43in.	21.18in.	20.19in.	15.93in.

* Three years only.

Algerian oats used each year.

Details of Total Produce Yields from Kybybolite Permanent Cultivation Plots with Oats, 1914-1916.

Plots.	1914.			1915.			1916.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
2 & 3	0	10	0	0	17	75	1	9	15	0	18	105
4 & 5		—		1	0	58	1	13	9	1	6	89†
6 & 7	0	9	81	1	0	11	1	11	47	1	0	46
8 & 9	0	10	0	0	19	86	1	7	102	0	19	25
10 & 11	0	8	37	1	6	104	1	14	88	1	3	39
12 & 13	0	9	52	1	6	2	2	1	36	1	5	67
14 & 15	0	12	25	1	1	90	2	3	26	1	5	84
16 & 17	0	7	87	1	3	17	2	2	7	1	4	37
18 & 19	0	10	62	0	16	52	2	7	1	1	4	76
20 & 21	0	13	100	1	2	60	2	10	110	1	9	15
22 & 23	0	7	87	1	1	39	1	9	41	0	19	56
24 & 25	0	6	75	0	13	26	1	8	87	0	16	25
26	0	3	37	0	13	58	1	9	32	0	15	42
Farm average for hay	0	16	59	1	0	65	1	14	102	1	4	1
Total rainfall		11.94in.			23.30in.			23.53in.			19.59in.	
"Useful" rainfall		8.43in.			21.18in.			20.19in.			16.60in.	

† Two years only.

These results still need the addition of the yields of a few more seasons before a correct interpretation of them can be made; but on the means of the four years there is nothing to make necessary any alteration in the conclusions drawn last year, viz.:—

(1) That some form of fallowing is necessary, for the alternate cropping without fallow (plots 2-3) is very little better than the annual cropping (plot 26).

(2) That when summer ploughed the land is better left until seeding operations rather than be stirred up soon after the ploughing (plots 22-25).

(3) That spring ploughing, providing cultivation follows, is a little better than any other form of treatment (plots 18-21).

(4) That land ploughed in the winter needs much after cultivation, and is the only time when summer cultivation is of much advantage (plots 14-15).

(5) That autumn ploughing does not give results equal to winter and spring ploughing, nor is it indeed much better than the summer ploughing alone (plots 4-9 and 22-23).

These results seem to hinge largely on the fact that these particular soils break down very finely at every cultivation, and when the rains come they set like a brick. This would certainly help to account for the failure of autumn ploughing, and is possibly the cause of the depressing effect of summer cultivation applied when the land has been ploughed in the spring and in the summer.

The above conclusions hold good for the means, but on last season's results some marked differences were shown. The greatest of these is the comparatively high yield obtained from the plot cropped every year (plot 26), and the crop produced on the plot only autumn ploughed (plots 4 and 5) was also rather startling; but in both cases they appear to be the result of the rather exceptional season, and by no means likely to be of common occurrence.

Permanent Depth of Ploughing Plots, Kybybolite.

This series of experimental plots was laid down in 1914, and then ploughed and cultivated for the first time, so they have to date carried two crops of wheat. The plots have as their object the testing of the value of various depths of ploughing done at different times of the year, and also the effects of varying the depth at which the land is ploughed. For the two years, 1915 and 1916, these plots have behaved as is set out in the following two tables, one showing grain yields and the other the total produce results:—

Kybybolite Permanent Depth of Ploughing Plots with Wheat.—Grain per Acre, 1915-1916.

Plots.	Depth of Ploughing.	1915. Bush. lbs.	1916. Bush. lbs.	Means. Bush. lbs.
1 & 1A	3in. in winter	7 51	9 19	8 35
2 & 2A	4½in. in winter	9 18	15 8	12 13
3 & 3A	6in. in winter	11 43	17 12	14 27
4 & 4A	7½in. in winter	10 53	18 20	14 36
5 & 5A	9in. in winter	12 37	17 22	14 59
6 & 6A	3in. in spring	11 22	11 48	11 35
7 & 7A	4½in. in spring	10 2	16 28	13 15

Kybybolite Permanent Depth of Ploughing Plots, &c.—continued.

Plots.	Depth of Ploughing.	1915. Bush.	lbs.	1916. Bush.	lbs.	Means. Bush.	lbs.
8 & 8A	6in. in spring	10	59	20	33	15	46
9 & 9A	7½in. in spring	13	48	21	49	17	48
10 & 10A	9in. in spring	14	49	23	15	19	2
11 & 11A	3in. in autumn at seeding	14	37	20	3	17	20
12 & 12A	4½in. in autumn at seeding	13	19	21	59	17	39
13 & 13A	6in. in autumn at seeding	15	22	23	13	19	17
14 & 14A	7½in. in autumn at seeding	13	18	24	45	19	1
15 & 15A	9in. in autumn at seeding	17	37	21	58	19	47
16 & 16A	4½in. in spring (Deeply ploughed every second fallow.)	11	2	26	15	18	38
17 & 17A	7½in. in spring (Deeply ploughed every second fallow.)	13	10	23	24	18	17
18 & 18A	4½in. in spring (Deeply ploughed every third fallow.)	12	54	23	13	18	3
19 & 19A	4½in. in spring (Deeply ploughed every third fallow.)	15	47	23	52	19	49
20 & 20A	7½in. in spring (Deeply ploughed every third fallow.)	16	33	21	51	19	12
21 & 21A	4½in. in spring (Deeply ploughed every fourth fallow.)	16	41	23	8	19	54
22 & 22A	4½in. in spring (Deeply ploughed every fourth fallow.)	13	31	29	5	21	18
23 & 23A	4½in. in spring (Deeply ploughed every fourth fallow.)	12	30	29	43	21	6
24 & 24A	7½in. in spring (Deeply ploughed every fourth fallow.)	10	26	28	50	19	38
	Farm wheat average	11	5	18	59	15	2
	Total rainfall	23.30in.		23.53in.		23.41in.	
	"Useful" rainfall	21.18in.		20.19in.		20.68in.	

Kybybolite Permanent Depth of Ploughing Plots with Wheat.—Total Produce per Acre, 1915-1916.

Plots.	Depth of Ploughing.	1915. T.	C.	L.	1916. T.	C.	L.	Means. T.	C.	L.
1 & 1A	3in. in winter	0	13	35	0	14	91	0	14	7
2 & 2A	4½in. in winter	0	12	46	0	19	109	0	16	21
3 & 3A	6in. in winter	0	15	57	1	7	14	1	1	35
4 & 4A	7½in. in winter	0	18	68	1	9	32	1	3	106
5 & 5A	9in. in winter	1	0	76	1	4	57	1	2	66
6 & 6A	3in. in spring	0	10	38	0	16	56	0	13	47
7 & 7A	4½in. in spring	0	15	40	1	9	5	1	2	22
8 & 8A	6in. in spring	0	15	40	1	8	79	1	2	3
9 & 9A	7½in. in spring	0	12	19	1	12	10	1	2	14
10 & 10A	9in. in spring	1	1	80	1	12	82	1	7	25
11 & 11A	3in. in autumn at seeding	0	17	46	1	7	56	1	2	51
12 & 12A	4½in. in autumn at seeding	0	12	32	1	10	26	1	1	29
13 & 13A	6in. in autumn at seeding	1	0	76	1	16	12	1	8	44
14 & 14A	7½in. in autumn at seeding	1	0	76	1	15	45	1	8	4
15 & 15A	9in. in autumn at seeding	0	17	46	1	12	6	1	4	82
16 & 16A	4½in. in spring (Deeply ploughed every second fallow.)	0	15	57	2	1	17	1	8	37
17 & 17A	7½in. in spring (Deeply ploughed every second fallow.)	0	16	61	1	16	75	1	6	68
18 & 18A	4½in. in spring (Deeply ploughed every third fallow.)	0	14	38	1	14	94	1	4	66
19 & 19A	4½in. in spring (Deeply ploughed every third fallow.)	1	2	84	1	18	32	1	10	58
20 & 20A	7½in. in spring (Deeply ploughed every third fallow.)	1	0	76	1	19	105	1	10	34
21 & 21A	4½in. in spring (Deeply ploughed every fourth fallow.)	0	14	53	1	17	85	1	6	13
22 & 22A	4½in. in spring (Deeply ploughed every fourth fallow.)	1	0	76	2	2	19	1	1	47
23 & 23A	4½in. in spring (Deeply ploughed every fourth fallow.)									
24 & 24A	7½in. in spring (Deeply ploughed every fourth fallow.)	0	13	35	2	2	28	1	7	87
		0	9	24	1	15	21	1	2	22
	Farm hay average	1	0	65	1	14	102	1	7	83
	Total rainfall	23.30in.			23.53in.			23.41in.		
	"Useful" rainfall	21.18in.			20.19in.			20.68in.		

Queen Fan wheat, and 1cwt. superphosphate to the acre were used on each plot.

This being only the second year of these depth of ploughing plots no hard and fast conclusions can be drawn from the returns of the plots, but taking the figures as they stand the differences between the yields obtained at the various depths of ploughing are fairly great; they are overwhelmingly in favor of the deepest ploughing, and they rise in more or less regular order from the shallow to deep ploughing. The yields of both grain and total produce of the autumn ploughed plots exceeded both the spring fallow and the winter fallow plots, and the spring ploughing was better than the winter ploughing. These differences are to be seen in the following table:—

Influence of Various Depth of Ploughing, Kybybolite, 1915-1916.

Treatment.	Grain per Acre.	Grain per Acre.	Total Produce per Acre.	Total Produce per Acre.
	Bush. lbs.	Bush. lbs.	T. C. L.	T. C. L.
9in. ploughing—Winter	14 59	—	1 2 66	—
Spring	19 2	—	1 7 25	—
Autumn	19 47	—	1 4 82	—
Means	—	17 56	—	1 4 95
7½in. ploughing—Winter	14 36	—	1 3 106	—
Spring	17 48	—	1 2 14	—
Autumn	19 1	—	1 8 4	—
Means	—	17 8	—	1 4 78
6in. ploughing—Winter	14 27	—	1 1 35	—
Spring	15 46	—	1 2 3	—
Autumn	19 17	—	1 8 44	—
Means	—	16 30	—	1 3 102
4½in. ploughing—Winter	12 13	—	0 16 21	—
Spring	13 15	—	1 2 22	—
Autumn	17 39	—	1 1 29	—
Means	—	14 22	—	0 19 96
3in. ploughing—Winter	8 35	—	0 14 7	—
Spring	11 35	—	0 13 47	—
Autumn	17 20	—	1 2 51	—
Means	—	12 30	—	0 16 72

PERMANENT MANURIAL PLOTS WITH WHEAT, KYBYBOLITE.

In 1915 this series of plots was mapped out and the plots cultivated ready for wheat, so that the results from these plots for this year are the first obtained, and being so, cannot be looked upon as proving anything, and until they have been continued for some little time

no correct interpretation can be hoped for. The results from the plots will be seen below:—

Permanent Manurial Plots with Wheat, Kybybolite, 1916.

Plot.	Fertilizers per Acre.	Grain per Acre. Bush. lbs.	Total Produce per Acre. T. C. L.
1	No manure	5 4	0 10 107
2	½cwt. superphosphate	9 17	0 18 96
3	1cwt. superphosphate	9 11	0 18 96
4	2cwts. superphosphate	11 44	1 3 50
5	3cwts. superphosphate	8 17	0 19 41
6	½cwt. basic slag	8 8	0 15 14
7	1cwt. basic slag	10 58	0 19 78
8	2cwts. basic slag	13 37	1 3 93
9	3cwts. basic slag	11 6	1 2 33
10	1cwt. bonedust	13 18	1 3 32
11	2cwts. bonedust	12 33	1 0 60
12	No manure	5 20	0 8 5
13	1cwt. superphosphate and ½cwt. nitrate of soda (seeding)	9 0	0 17 1
14	1cwt. superphosphate and ½cwt. nitrate of soda (spring)	12 49	1 0 86
15	1cwt.superphosphate and ½cwt. sulphate of ammonia	10 15	0 17 55
16	1cwt. superphosphate and ½cwt. nitrate of lime (seeding)	11 6	0 18 94
17	1cwt. superphosphate and ½cwt. nitrate of lime (spring)	12 9	1 0 61
18	1cwt. superphosphate and ½cwt. sulphate of potash	13 34	1 5 83
19	1cwt. superphosphate, ½cwt. nitrate of soda, and ½cwt. sulphate of potash	12 14	1 4 23
20	1cwt. superphosphate and 10cwts. lime	16 36	1 8 82
21	10 tons farmyard manure	14 53	1 4 81
22	10 tons farmyard manure and 1cwt. superphosphate	18 18	1 11 10
23	10 tons farmyard manure, 1cwt. super., and ½cwt. sulphate of potash	19 30	1 14 45
24	10 tons farmyard manure, 10cwts. lime, and 1cwt. superphosphate	17 51	1 11 0
25	10cwts. lime	10 59	0 17 59
26	1 ton lime	11 43	0 17 16

Queen Fan wheat used on all plots.

PERMANENT MANURIAL PLOTS WITH OATS, KYBYBOLITE.

This series of plots was laid down at the same time as the wheat manurial plots, and here the plots get exactly similar treatment and manuring as the above, but are seeded with oats instead of wheat. This year's results will be found in the next table:—

Permanent Manurial Plots with Oats, Kybybolite, 1916.

Plot.	Fertilizers per Acre.	Grain per Acre.		Total Produce per Acre.		
		Bush.	lbs.	T.	C.	L.
1	No manure	20	0	0	19	50
2	½cwt. superphosphate	25	38	1	7	109
3	1cwt. superphosphate	24	21	1	5	0
4	2cwts. superphosphate	27	33	1	8	53
5	3cwts. superphosphate	31	5	1	11	52
6	½cwt. basic slag	22	19	1	2	25
7	1cwt. basic slag	23	20	1	3	54
8	2cwts. basic slag	20	30	1	0	79
9	3cwts. basic slag	17	19	0	18	38
10	1cwt. bonedust	19	7	0	19	58
11	2cwts. bonedust	21	8	1	1	37
12	No manure	14	21	0	13	80
13	1cwt. superphosphate and ½cwt. nitrate of soda (seeding)	19	4	1	1	95
14	1cwt. superphosphate and ½cwt. nitrate of soda (spring)	15	25	0	18	65
15	1cwt. superphosphate and ½cwt. sulphate of ammonia	21	17	1	6	41
16	1cwt. superphosphate and ½cwt. nitrate of lime (seeding)	21	12	1	5	85
17	1cwt. superphosphate and ½cwt. nitrate of lime (spring)	19	6	1	1	80
18	1cwt. superphosphate and ½cwt. sulphate of potash	22	15	1	5	28
19	1cwt. superphosphate, ½cwt. nitrate of soda, and ½cwt. sulphate of potash	24	15	1	5	28
20	1cwt. superphosphate and 10cwts. lime	27	3	1	11	72
21	10 tons farmyard manure	29	7	1	6	37
22	10 tons farmyard manure and 1cwt. superphosphate	31	19	1	14	10
23	10 tons farmyard manure, 1cwt. super., and ½cwt. sulphate of potash	29	1	1	11	10
24	10 tons farmyard manure, 10cwts. lime, and 1cwt. superphosphate	32	7	1	14	108
25	10cwts. lime	23	18	1	5	34
26	1 ton lime	27	38	1	6	45

Algerian Oats used on all plots.

Temporary Field Experiments.

Although the permanent experiments being conducted at this farm are rather considerable, yet it is customary to carry out other field experiments as opportunity offers. This year "Ephos" basic phosphate was put on the Australian market, and if this is to be successful under our peculiar conditions it is in places such as Kybybolite where it should be so. To test it out it was compared with the well-known phosphatic manures, superphosphate, and basic slag on both wheat

and oat plots. Results from both series are set out in the two following tables:—

Manurial Test with Federation Wheat.

Fertilizers per Acre.	Grain per Acre. Bush.	lbs.	Total Produce per Acre. T.	c.	L.
1cwt. basic slag	26	9	2	4	44
2cwts. basic slag	25	27	1	17	85
1cwt. "Ephos" basic phosphate	21	55	1	10	97
2cwts. "Ephos" basic phosphate	15	4	1	8	64
3cwts. "Ephos" basic phosphate	20	39	1	10	69
1cwt. superphosphate	24	44	1	18	87
1cwt. superphosphate and 2cwts. hashmagandy	23	47	1	12	16
1cwt. superphosphate and 4cwts. hashmagandy	30	18	1	19	89

Manurial Test with Algerian Oats.

Fertilizers per Acre.	Grain per Acre. Bush.	lbs.	Total Produce per Acre. T.	c.	L.
1cwt. basic slag	18	8	0	18	84
2cwts. basic slag	19	34	1	0	35
1cwt. "Ephos" basic phosphate	22	10	1	4	0
2cwts. "Ephos" basic phosphate	23	0	1	2	103
3cwts. "Ephos" basic phosphate	16	26	0	16	62
1cwt. superphosphate	21	18	1	1	98
1cwt. superphosphate and 2cwts. hashmagandy	19	25	1	3	105
1cwt. superphosphate and 4 cwts. hashmagandy	20	13	1	6	5

EXPERIMENTS TESTING THE ACTION OF DRY PEAT DRILLED INTO A WHEAT CROP.

These experiments were conducted to discover if the addition of comparatively small amounts of dry peat have any beneficial effect on a wheat crop. The increased yields obtained are sufficiently promising to warrant the continuance of the tests, and so similar plots were laid down this season. In this series the dry peat was drilled into the wheat crop with the ordinary seed and fertilizer drill some little time after the wheat had germinated.

Testing Peat on Federation Wheat.

Treatment.	Grain per Acre. Bush.	lbs.	Total Produce per Acre. T.	c.	L.
1cwt. superphosphate	24	55	1	14	8
1cwt. superphosphate and 242lbs. peat	26	11	1	17	33
1cwt. superphosphate and 485lbs. peat	29	15	2	0	59
1cwt. superphosphate and 727lbs. peat	27	46	2	0	59

Lime Test at Kybybolite.

In 1915 a block of land was limed at the rate of one ton to the acre, and wheat was grown on the treated block. As was shown in last year's report for this farm the increased yield on the limed portion was only 1½bush. in excess of the unlimed, but as was pointed out at the time the whole crop (Bayah) was affected by red rust, and the limed portion, which made much ranker growth, was considerably more damaged by the disease than was the unlimed portion. The field was this year sown to Algerian oats for hay, and the limed portion was harvested separately from the unlimed, with the following result:—

Lime Test, Kybybolite, 1915-1916.—*Algerian Oats for Hay.*

Plot limed in 1915 before a crop of wheat.

Treatment.	Area. Acres.	Total Hay. T.	C.	L.	Hay per Acre. T.	C.	L.
1 ton lime in 1915, 1cwt. superphosphate at seeding	2.88	5	8	84	1	17	85
1cwt. superphosphate	4.10	4	18	56	1	4	3

GENERAL.

The Manager of the Kybybolite Experimental Farm (Mr. L. S. Davie) in his report states that both the cultivation plots and depth of ploughing plots grew well right from germination, and so satisfactory crops were harvested. The manurial tests with oats are grown on land that is rather flat, and so becomes fairly wet in winter; part of it is virgin land and part has been worked before, and taking everything into consideration this year's results are pleasing. Some of the land on which the manurial tests with wheat are conducted is full of crabholes, and the whole of it is rather flat, with the result that some patches were drowned right out. The crops have been quite free from diseases all through, and as they germinated very slowly the variations in the yields appear to be caused by excess of water that is unable to drain away. The wet fields have not in any instances given satisfactory yields.

FRUIT NOMENCLATURE.

The Pomological Committee of Australia.

The 1917 meeting of the above Committee was held at the Government Experiment Farm Orchard, at Bathurst, New South Wales, in April, 1917. The following delegates attended, Mr. L. M. Shoobridge being elected Chairman:—New South Wales—Mr. W. J. Allen (Government Fruit Expert) and Messrs. C. C. Tucker and F. Chilton (representing the Fruitgrowers' Associations), with Mr. F. J. Adamson (representing the Nurserymen's Association); Tasmania—Messrs. J. M. Ward (Government Fruit Expert) and L. M. Shoobridge (representing the Fruitgrowers); Victoria—Messrs. E. E. Pescott (Government Pomologist) and Jas. Lang, J.P. (representing the Fruitgrowers' Associations); South Australia—Messrs. G. Quinn (Government Horticultural Instructor) and G. R. Laffer, M.P. (representing the fruitgrowers).

Correspondence from the Departments of Agriculture of Queensland and West Australia was received, intimating that the former State could not undertake to continue its representation, and from the latter that distance prevented delegates attending. The latter State conveyed its intention of accepting the decisions of the Committee, and it was resolved to ask the former if the support of the Agricultural Department would be given to the resolutions agreed upon. The Hon. Secretary (Mr. Pescott) reported business arising out of previous meetings.

Fruit Models.

At the 1916 meeting 23 standard varieties of apples and pears had been selected for the production of models typical of these sorts as grown in the Australian States, and an artist (Mr. White, of Melbourne) had been commissioned to make the models. Owing, however, to illness, he had been unable to complete the sets of four of each of the selected sorts. He wrote asking for further specimens to enable the work to be completed exact to the coloring. The modeller intimated further that he would not undertake to make any other models unless an order equal to £200 in value were given him. In respect to this, the Committee decided to await the result of the completion of the present order.

Standard Fruit Cases.

This matter was brought before the Committee by request, and Mr. Laffer urged the need for the uniform standards for fruit cases as agreed upon at the Conference of State Ministers of Agriculture in 1914 being legalized by the States not yet thus supplied with such powers. It was agreed that this was desirable, but that a deficiency or excess of not less than 2½ per cent. of the cubic capacity should be allowed to provide for the shrinkage of green case timber. The Under Secretary for Agriculture in New South Wales was asked to bring this matter before the State Departments where these standard cases had not been adopted.

It was arranged that the official representative in each State act as a secretary to the local committee, and invite leading fruitgrowers and others to attend the meetings of the Pomological Committee when meeting in any State.

Certificates of Merit for Locally Raised Fruits.

It was resolved, with a view to these being available to deserving specimens, that each official delegate prepare a list of proved and valuable seedling apples and pears raised in his State, and furnish at the next meeting full particulars of origin, with descriptions and photographs, as well as matured fruits, of such varieties. For the purposes of the description a uniform table of characters was agreed upon, and included in the report of the proceedings of the 1917 meeting. This was based on Dr. Hogg's Fruit Manual for a detailed description of the fruit itself, but provision was made for describing the various characteristics of the tree with the stock (if grafted), as well as the climatic and soil conditions under which it grew.

Local Sub-Committees.

Local Sub-Committees were deemed desirable in each State, to deal with current matters relating to the work of the General Committee between the various times of its meetings, and the delegates were nominated in this capacity at a previous meeting. Mr. Ward related in a report the actions of the local committee in Tasmania in respect to certain stone fruits. Mr. Laffer drew attention to the need of securing the co-operation of the nurserymen in each State in so far as the issue of their catalogues was concerned, and it was resolved to place the reports of these proceedings before the nurserymen in all States.

Blight-Proof Apples.

Mr. Allen produced a list of varieties of apples deemed to be blight-proof or resistant to American woolly blight in New South Wales orchards, and remarked upon the variability noted in the powers of resistance displayed by the same apples when grown in different districts. Messrs. Shoobridge and Ward concurred in this opinion. It was resolved that each State's representatives should draw up a similar list for presentation at a future meeting, and the States not represented be asked to do likewise.

Deferred Nomenclature from 1916 Meeting.

Winter Strawberry or Strawberry Pippin.—Specimens grown under one or other of these names were brought from New South Wales, South Australia, and Tasmania, and it was decided that the New South Wales specimens were truly named, whilst those apples grown in South Australia as Strawberry Pippin were really Winter Strawberry, but the Tasmanian specimens could not be defined without further research.

Carrington and Lady Carrington.—It was pointed out the apple sent out by Gembrook Nurseries in Victoria as Carrington was Thorle Pippin; also, another apple grown in that State under the name of Carrington was really Aiken's Seedling. It was pointed out that the scions for propagating the first named apple originated at the Burnley collection. It was generally agreed that the Carrington

variety known as the Red Carrington was a very profitable early ripening apple in the warm coastal districts in the vicinity of Sydney, also it was blight-proof. Mr. Adamson pointed out that there were two types (a red and a striped form) in New South Wales. He considered it was a better tree for use as stock than the Northern Spy.

Dutch Mignonne.—Specimens of this apple from Victoria and Tasmania were not deemed correct.

Exhibits for 1917.

About 420 dishes of fruit were exhibited by the members, and of these 280 were apples. A great many seedling or allegedly seedling apples and pears under their local names were tabled for the inspection and opinions of the Committee.

By Mr. Allen (N.S.W.)—Brown's Pippin, raised by a Mr. Brown, N.S.W.; Granny Hunter, raised by Mr. A. Hunter, Penang, Gosford; Hornsby, grown by Mr. Higgins, Hornsby; Ebenezer Pippin; Jupp's Surprise; Shepherd's Seedling.

By Mr. Chilton (N.S.W.)—Jackson's Seedling, Thompson's Red Seedling.

By Mr. Lang (Vic.)—Streamville, raised by a Mr. Murphy, at Aitken's Creek, Victoria; Lang's Seedling, raised by Mr. Jas. Lang, Harcourt, Victoria.

By Mr. Ward (Tas.)—Croton; as this name was confused with Crofton, it was decided to recommend it be changed to Ranelagh, where it was raised, in Tasmania. Tasma; as this apple has been sold as Democrat, it was decided to ask nurserymen to adhere to the name of Tasma, owing to its claims to priority. Australian Beauty; seedling (unnamed), raised by a Mr. Judd, Huon, Tas.; Lord Kitchener, raised by Mr. Wallace Kellaway, Huon, Tas.; Franklin Belle, grown by Mr. Freeman, Franklin, Tas.; Huon Belle, by the same raiser; seedling (unnamed), raised by J. Clark & Son, Launceston, and claimed to be blight-proof; seedling (unnamed), from Mr. Stewart's, St. Leonard's, Launceston, Tas.; Sturmer Seedling, grown by Mr. Waldron, Wyend, Tas.; two alleged seedlings, one grown without name by Mr. Widdowson, Georgetown, Tas., and the other as Two Bays Seedling, by W. G. Elliston, Latrobe, Tas., were identified as varieties already known as Port Dalrymple and Coleman's Late Aromatic respectively.

Seedling Pears.

By Mr. Allen (N.S.W.)—Unnamed seedling grown by Mr. Gazzard, Clergate, N.S.W. Mr. Allen also promised to obtain specimens of a seedling from Packham's Triumph pear.

By Mr. Ward (Tas.)—Judd's Beurre, raised by the late Mr. Judd, Franklin, Tas.

The whole of these seedlings were carefully examined and discussed. Some were regarded as quite valueless, whilst others were particularly promising. It was resolved that in every instance where the fruits presented any promising feature to bring them up for further examination at a future meeting of the Committee.

(To be concluded.)

SARCOSPORIDIOSIS.

A PREVALENT SHEEP PEST.

Frequent reference has been made in the pages of the *Journal* to sarcosporidiosis, and correspondence from sheepowners in different parts of the State indicates that considerable losses have occurred as a result of this pest.

Writing from Inman Valley, a correspondent states that he has crossbred hoggets dying in pasture noted for its quality. Despite the fact that there are other wethers and ewes lambing in the same paddocks, during the past month a score of well-grown hoggets have died. Some have scoured badly, some not at all; some swell at the jaws, and some do not. They seem slow and sluggish, and there is no sign of worms in the stomachs of those opened. When shifting, two that travelled four miles the first afternoon and nine miles next day, and three the next morning, apparently as strong as any sheep in the grown flock, dropped back, and before they could be put in the cart, one staggered and dropped dead; the other died soon after in the cart. There was no sign of scour or swollen jaws. *They all seemed to be almost bloodless;* they were in *good* store condition. Another good store was lying dead, with no indication of a struggle; no dung passed, hardly any blood in the veins, and the flesh white. In several *the heart pocket contained a lot of fluid.*

In replying to the correspondent, the Veterinary Lecturer (Mr. F. E. Place, B.Sc., M.R.C.V.S.) states that the above is the best description by a lay observer that has reached him, especially the points in italics. The disease is the one so often referred to as sarcosporidiosis, common from Broken Hill to Port MacDonnell.

The cause is a parasite, very tiny, only to be seen under a high power of the microscope, which gets into the red blood cells and breaks them down, hence the "almost bloodless" condition noticed. When the blood is poor there is a tendency to lay on white fat quickly, hence the white appearance of the flesh, and the "good" store condition. The heart has to work much faster and harder on poor than on good blood, hence the excess of fluid in the heart pocket, the pericardium, and the collapse after exertion.

The parasites are a developmental stage of the omnipresent organism called amœba, in water and moist situations. Pastoral country? Yes; there are bores there. These parasites are swallowed in food and drink, and find their way through the blood vessels of the bowels into the circulation, and so into the cells and also into the muscle fibres, especially those of the overworked heart.

Why do the good ones collapse? Because acute anæmia is most fatal to early adult life. Hoggets, on account of the developmental processes making a heavier demand on certain organs and tissues

then, rather than when younger or older, and because when the blood is rich in certain substances, as it is when the sheep is rapidly improving in condition, then the parasites are able to multiply more rapidly.

Treatment.—Factors: sheep, pasture, parasites. Move the sheep from paddock to paddock as frequently as possible, so that each area gets a chance of a week's air and sun free of sheep. Put the older or younger sheep on first, so that they may prevent the feed being too rich for the hoggets, and when these are seen to be moving fast in condition move on to poorer feed. Licks containing lime and phosphates will be of some use when sheep will take to them, made as follows:—Salt 50, slaked lime 40, superphosphate 10, resin 5, saltpetre 5, sulphate of iron 5 parts. When hand-feeding is a regular part of sheep management, as one day it will be, then this can be mixed with the feed; at present it must be put into boxes and the sheep enticed on to it. Treatment of affected sheep, except by a sharp knife across the neck, is not much good, but arsenic in some form or other, and preferably in the form of Cooper's tablets, on account of their ease in administration, is the best drug for the condition; but the sheep will have to receive a series of doses for a week or a fortnight before much improvement will be noticed. In the staggering stage, immediate relief can be afforded by bleeding at the eye or leg vein, but it is a last resource. Bleeding for bloodlessness seems a queer treatment, but the poor blood is taken, and Nature repairs with better if she is able. When the pasture can be dressed with salt, super., or lime, benefit will result, as it will improve in nature, and sheep will not bottle at the jaw on it after, as such treatment will destroy other parasites, such as worms and flukes, which at times may be present.

When the waterholes are seen to have a shimmering gleam on them in the morning and evening, when the sun's rays lie flat across them, they are full of amœbæ, and it will be well to scatter slaked lime over the surface in bags or by hand at the rate of a pound per thousand gallons, and follow this by alum at the same rate an hour or two later. This treatment will carry the parasites to the bottom, where, unable to get oxygen, they will die.

If sheep men would be good enough to read, mark, learn, and inwardly digest these remarks the writer would be thankful. The disease is known as heart water in India and Africa, as carceag in Scotland, pernicious anæmia in England.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, July 11th, there being present Messrs. F. Coleman, G. Jeffrey, J. Miller, A. M. Dawkins, W. J. Colebatch, and H. J. Finnis (Acting Secretary).

Apologies were received from Professor Perkins, Messrs. T. H. Williams, C. J. Tuckwell, A. W. Shillabeer, G. R. Laffer, M.P., and Colonel Rowell, C.B.

Appointment of Officers.

The Secretary having mentioned that the Minister of Agriculture had re-appointed Messrs. Dawkins, Jeffrey, and Colonel Rowell, C.B., members of the Board, the following officers were elected for the ensuing year:—Chairman, Mr. Geo. Jeffrey; Vice-Chairman, Mr. C. J. Tuckwell.

Wheat Certificates.

A communication, in reply to a letter from the Board, was received from the Wheat Harvest Board in regard to the practice adopted in issuing wheat certificates. It pointed out that where interim receipts had to be exchanged for wheat certificates, one of three courses of procedure had to be adopted. (1) The farmer to send his interim receipts to the firm concerned, and in the course of a few days receive a certificate in exchange. That prevailed most widely in South Australia. (2) For the merchant to send his wheat certificate to the farmer, and the farmer to post the interim receipts to the merchant upon receiving a certificate. Government agents would not for a moment agree to adopt that procedure. (3) For the certificates to be sent to the sub-agent, and the farmer to exchange the interim receipt for the certificate at the office of the sub-agent. That procedure had been followed to some extent, but as farmers complain that it was inconvenient to travel long distances to railway stations, etc., sometimes to find certificates had not arrived, No. 1, as shown before, had become the most widely used method. If the Pinnaroo Branch of the Bureau could suggest a better and workable scheme, it would receive careful consideration. If any injustice had been done to any farmer in that connection, and it was brought under notice, it would be put right. The Advisory Board decided to forward a copy of the report to the Pinnaroo Branch.

Point Judging of Livestock.

Further consideration was given the 1916 Congress resolution, urging that judging of livestock and implements at agricultural shows, subsidised by the Government, should be on a system of points to be shown on cards. It was decided to seek the opinion of the Royal Agricultural and Horticultural Society on the subject.

Flax, Figs, and Tobacco on the Murray.

The Director of Agriculture (Professor Arthur J. Perkins) submitted the following notes on the resolution of the River Murray Conference, wherein it was suggested that certain lines including

flax, prunes, figs, tobacco, and canary seed might be tested on an experimental farm on the Murray:—

"I have noted the recommendation of the River Murray branches at their Conference of June 28th, and in connection therewith beg to submit the following remarks:—

Flax.—Although it is true that this plant is grown, to a certain extent, under warm climates such as India, Northern Africa, etc., it is to a limited extent only. On the whole, flax is a cold country crop, being grown chiefly in Russia, Germany, Austria, and Italy. I am doubtful of its value in the valley of the Murray, but have greater hopes of it in the South-East, and I have already given it a trial on the Kybybolite Farm. If circumstances permit of it I shall, however, give it a trial on the Berri Farm.

Prunes and Figs.—The Horticultural Instructor will no doubt attend to these matters when he takes over the orchard at Berri.

Tobacco.—I am prepared to give this crop a trial on a small scale. The question of handling and maturing the crop, however, involves expert knowledge which we do not at present possess in the department.

Canary Seed.—I am rather doubtful of the value of this crop, except on a very limited scale."

Bureau Membership.

The Board was unable to adopt the recommendation of the Longwood Branch, that the rule of the Agricultural Bureau which provided that one-third of the members of a Branch have to retire annually, but were eligible for re-election, should be amended.

Overhead Irrigation.

A request from Berri that the Department of Agriculture should conduct an experimental test with a spray system of irrigation, was referred to the Horticultural Instructor (Mr. Quinn).

Weighing Stumps.

The Geranium Branch expressed the view that trucks of stumps weighed over railway bridges were not accurately weighed on account of the weights being taken whilst the trucks were in motion. It was decided to forward the Branch's communication to the Railways Commissioner for comment.

Destroying Sparrows.

The Lone Pine Branch sought a supply of poisoned wheat for destroying sparrows. It was decided to suggest that they communicate with the local district council.

Dairy Factories Conference.

Mr. F. Coleman reported on the Conference of representatives of butter, bacon, and cheese factories which had been held under the auspices of the Board on June 19th and 20th. The Board indorsed and forwarded to the Minister of Agriculture a resolution from the Conference urging that it should be made compulsory for all factories to pay for cream on a commercial butter basis according to O'Callaghan's chart, which provided for a 17½ per cent. overrun.

Before dealing with a resolution from the Conference recommending the Government to appoint instructors and inspectors to visit the dairy farmers and factories, it was decided to seek information as to the practice adopted in other States.

Butter Freights and Prices.

The Chairman (Mr. Geo. Jeffrey) and Mr. Shillabeer were deputed to confer with the Dairy Expert (Mr. P. H. Suter) with the idea of selecting representatives to attend a conference of dairy producers to be held in Melbourne on July 25th and 26th to consider questions relating to the marketing of dairy produce, etc.

Soldiers' Fund.

The Secretary reported that wheat certificates (first advance paid), cheques, etc. to the value of £89 1s. 10d. had been received from various branches as donations to the Soldiers' Fund. It was decided that steps should be taken to secure further contributions during the coming year.

Control of Weighbridges.

At a meeting of the Advisory Board, held July 11th, Mr. A. M. Dawkins referred to the question of the need for more effective supervision of weighbridges in this State. He mentioned that teamsters who had weighed the one load on three or four different bridges had obtained as many different weights, and consequently there had been quarrels between the suppliers and the buying merchants regarding the correct weights. Mr. W. J. Colebatch (Principal of Roseworthy College) said he had endeavored to get somebody to test the weighbridge at the College, but had not been able to find any authority to undertake the work. It was decided to ascertain in what manner supervision was exercised over weighbridges in South Australia.

Life Members.

The name of Mr. T. Stanton, Honorary Secretary of the Tatiara Branch, who had been a member of the Bureau for over 20 years, was added to the list of life members. At the previous meeting of the Board Mr. F. Kaerger was appointed a life member of the Agricultural Bureau. In the July issue of the *Journal* this gentleman's name was spelt incorrectly.

New Members.

The following additions were made to the rolls of existing branches:—Northfield—T. Holbrook; Mundalla—E. H. Hodges; Bundaleer Springs—F. Cook; Salt Creek—H. G. Hornhardt, F. W. Braunack, J. Abrook, G. E. Barber; Beetaloo Valley—E. Klemm; Longwood—G. Teasdale; Mount Barker—F. Daddow; Mallala—G. L. Teakle; Butler—H. J. A. Charlton, R. L. Phillis, W. T. Aird, G. W. Bray; Rosy Pine—Z. C. Lucier; Willowie—Andy Brown, Ed. Lang; Narrung—J. Martin, G. Bottrill, L. Rumbelow; Belalie North—S. Goodes; Milang—S. Hopgood; Cherry Gardens—J. H. R. Ferris; Koonibba—H. Schultz; Morehard—W. A. Brown, R. L. Davey, E. L. Bowman, R. L. Bates, R. V. Piggott; Kingston-on-Murray—J. E. Harrington; Naracoorte—W. W. Gould; Geranium—F. Hughes; Lone Pine—W. Both, jun., A. Nelder, T. Lehmann; Yeelanna—W. L. Williams; Inman Valley—S. Garring; Pompoota—D. Dyke, G. I. Kidd; Yaninee—H. Schultz, H. Hawthorn, W. Parker, H. Edmonds; Mypolonga—O. W. A. Knebel; Lyndoch—W. Thomas, G. Taylor; Clare—G. Paterson, J. Inglis; Tatiara—F. L. Milne, F. H. Duffield, F. Danke, H. B. Witham, P. Edwards; Murray Bridge—J. Comnyns; Berri—A. Tomlin; Morgan—E. Freyer.

The Agricultural Bureau of South Australia.

TWENTY-EIGHTH ANNUAL CONGRESS

TO BE HELD IN THE

OSBORNE HALL, GOUGER ST., ADELAIDE,

ON

September 10th and 11th, 1917.

AGENDA.

Opening Session: Monday, September 10th, 8 p.m.

Opening Address: His Excellency the Governor (Sir Henry Galway).

Other Speakers—Minister of Agriculture; Chairman Advisory Board of Agriculture (Mr. Geo. Jeffrey).

Tuesday, September 11th, 9·30 a.m.

9·30 Address: "Lines and Points in relation to the Symmetry of the Horse." Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.)

10·45 Paper: "Fodder Crops in the Mallee." Mr. J. M. Braithwaite (Halidon Branch).

12 Paper: "Noxious Weeds." Mr. A. L. McEwin (Blyth Branch).

Afternoon Session, 2·15.

2·15 Paper: "The Sugar Beet Industry." Mr. W. Hart (Millicent Branch).

3 Paper: "The Fox, and how to contend against him." Mr. W. Cuming (Strathalbyn Branch).

Paper: "Rabbit Destruction." Mr. Frank Lock (Dowlingville Branch).

" " " Mr. V. V. Crase (Bookpurnong East Branch).

3·45 FREE PARLIAMENT.

Evening Session, 8 o'clock.

Address: Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., Principal Agricultural College, Roseworthy.

If found necessary, the Congress will be continued on Thursday morning, the 13th September.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on August 1st:—

BUTTER.—Production further increased during July, but an embargo placed on exports to Western Australia had the effect of bringing prices back, and as this State for the last two or three weeks has had a surplus, this has found a market in the eastern States. Values receded to a point at which "Alfa" in pound prints was selling at 1s. 2d., and "Primus" at 1s. 1½d., though at the close of the month the market had firmed to "Alfa," 1s. 3d.; "Primus," 1s. 2½d.; third-grade creamery, 11½d. to 1s.; choice separators and dairies, 11½d. to 1s. 0½d.; fair quality, 10½d. to 11d.; store and collectors', 9½d. to 10½d. per lb.

EGGS.—Market during the month was fairly steady, the increasing quantities coming forward finding good local and interstate demand, prices at the end of the month being 10d. per dozen loose for hen; duck, 11d.

CHEESE.—Already some of the new season's make is in evidence, and in consequence the range in prices is a shade wider. Supplies continue to arrive in large quantities, and interstate demand keeps the floors clear, quotations being from 8½d. to 9½d. per lb. for large to loaf.

HONEY.—The quantities coming to hand are now quite inconsiderable, values being from 4d. to 4½d. per lb. for prime clear extracted.

ALMONDS are scarce, last season's crop being practically exhausted. Only small lots are coming forward, which are finding buyers at 1s. per lb. for Brandis; mixed softshells, 11½d.; hardshells, 7d.; kernels, 1s. 10d. per lb.

BACON.—Rates are a shade lower owing to the larger quantities now being marketed. Sides and middles are in good demand, but hams are not in much request. Best factory cured sides, 9½d. to 10d.; middles and hams, 10½d.; rolls, 9d. per lb.

LIVE POULTRY.—Competition continues very keen in this line, and although large numbers are coming along, the active demand quickly clears all lots submitted, with prices well maintaining. Heavyweight table roosters, 3s. to 4s. 3d. each; nice conditioned cockerels and plump hens, 2s. 3d. to 3s. 6d. each; light birds, 1s. 6d. to 2s.; ducks, 2s. 3d. to 3s.; geese, 5s. 6d. to 7s. each; pigeons, 5d. each; turkeys, from 6½d. to 9d. per lb. live weight for fair to good table birds.

POTATOES.—There is nothing special to report, the supply of South-Eastern potatoes being more than equal to demand, consequently only a limited supply of Victorians has been imported. Prices eased slightly during the month, but have since firmed again. ONIONS.—The onion market has been very disturbed during the latter part of July, and in one week prices rose £3 per ton. Quotations.—Potatoes, £4 to £5 per ton of 2,240lbs. on trucks Mile End or Port Adelaide; onions, £9 to £9 10s. per ton on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of July, 1917, also the average precipitation to the end of July, and the average annual rainfall.

Station.	For July, 1917.	To end July, 1917.	Av'ge. to end July	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	0·84	4·12	3·32	4·76
Tarcoola	1·03	6·13	3·76	7·58
Hergott	1·41	4·08	3·63	6·04
Farina	1·65	5·32	4·10	6·70
Leigh's Creek ...	2·17	8·03	5·15	8·66
Beltana	1·87	8·68	5·44	9·22
Blinman	3·21	9·70	7·80	12·83
Hookina	5·23	18·42	6·34	—
Hawker	5·12	17·96	6·96	12·22
Wilson.....	4·42	14·15	6·88	11·78
Gordon	3·22	14·75	5·55	10·26
Quorn	4·82	10·60	7·66	13·78
Port Augusta....	1·80	7·92	5·48	9·46
Port Augusta W..	1·82	8·46	5·15	9·36
Bruce	2·69	10·27	5·40	10·01
Hammond	3·73	14·42	6·20	11·46
Wilmington	3·70	13·93	10·32	18·26
Willowie	3·22	13·14	6·44	11·90
Melrose	5·72	22·32	13·57	23·04
Booleroo Centre..	2·82	14·04	8·62	15 83
Port Germein ...	1·69	10·03	7·22	12·84
Wirrabara.....	5·37	18·63	10·96	18·91
Appila	2·90	12·50	8·28	15·08
Cradock	3·44	13·42	6·07	10·86
Carrieton	4·03	15·47	6·73	12·22
Johnburg	2·78	12·22	5·42	10·21
Eurelia	4·52	16·26	7·13	13·24
Orroroo	3·16	14·61	7·65	13·42
Black Rock	3·13	13·61	6·85	12·25
Petersburg	2·71	14·09	6·93	13·07
Yongala	3·21	14·66	7·47	13·94
North-East.				
Ucolta	2·10	12·02	—	—
Nackara	2·97	12·42	5·12	—
Yunta	2·83	12·42	4·89	8·22
Waukaringa	2·09	10·39	4·50	7·94
Mannahill	1·49	8 89	4·68	8·46
Cockburn	1·40	8·52	4·63	7·97
Broken Hill, NSW	2·31	10·54	5·61	9·63
Lower North.				
Port Pirie	2·14	10·82	7·71	13 21
Port Broughton .	2·24	9·16	10·43	14·33
Bute	3·28	12·56	9·17	15·42
Laura	4·00	15·11	10·10	18·22
Caltowie	2·90	13·06	9·18	17·27
Jamestown	3·33	14·00	12·43	17·46
Gladstone	2·93	13·39	8·72	16·00
Crystal Brook....	2·95	12·65	8·76	15·62
Georgetown	3·35	15·74	10·24	18·32
Narridy	2·76	12·81	9·31	16·79
Redhill	3·14	13·81	9·60	16·79

Station.	For July, 1917.	To end July, 19.7.	Av'ge. to end July.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	3·97	15·42	10·41	20·25
Gulnare	3·84	15·13	9·76	19·74
Bundaleer W. Wks.	4·03	15·07	8·94	17·29.
Yacka	3·60	13·37	8·51	15·27
Koolunga	3·07	13·66	8·91	15·94
Snowtown.....	2·74	12·52	9·09	15·70
Brinkworth	3·59	13·81	8·56	15·48
Blyth.....	3·18	13·97	9·36	16·34
Clare	5·19	21·75	14·02	24·30
Mintaro Central...	7·01	24·39	12·23	21·99
Watervale.....	6·53	25·80	15·37	27·17
Aubnrn	5·35	22·97	13·17	24·25
Hoyleton	2·88	14·59	10·08	17·96
Balaklava	1·91	10·62	9·07	16·03
Port Wakefield ..	1·42	10·82	8·06	13·13
Terowie	3·11	11·98	7·19	13·71
Yarcowie	3·17	13·34	7·61	13·91
Hallett	2·98	10·86	8·77	16·40
Mount Bryan ...	3·45	11·85	8·70	15·73
Burra	3·99	12·33	10·17	17·82
Farrell's Flat	4·75	13·93	10·56	18·87
West of Murray Range.				
Manoora	4·59	17·00	9·78	18·09
Saddleworth	3·50	15·67	11·28	19·69
Marrabel	4·15	16·52	10·72	18·94
Riverton	4·14	18·89	11·71	20·48
Tarlee	3·28	14·79	9·44	17·48
Stockport	2·72	14·34	9·04	15·89
Hamley Bridge ..	2·18	11·25	9·41	16·45
Kapunda	3·84	15·10	11·35	19·67
Freeling	2·67	12·34	10·18	17·85
Greenock	4·32	16·10	14·08	21·46
Truro.....	5·32	16·70	11·23	19·74
Stockwell	4·47	15·42	10·39	20·30
Nuriootpa	3·92	15·07	11·96	21·25
Angaston	4·82	17·79	12·67	22·25
Tanunda	4·38	16·40	12·92	22·28
Lyndoch	4·68	17·13	13·12	23·01
Williamstown ..	6·96	—	—	—
Adelaide Plains.				
Mallala	1·69	10·48	9·67	16·88
Roseworthy	2·45	12·70	9·97	17·31
Gawler	2·66	14·58	11·29	19·21
Two Wells	1·34	8·67	9·73	16·36
Virginia.....	2·17	12·57	10·30	17 58
Smithfield	2·71	14·69	9·97	17·30
Salisbury	3·77	15·13	11·06	18·57
North Adelaide ..	4·94	21·38	13·84	21·49
Adelaide	4·10	17·92	12·77	21·04
Brighton	6·56	24·07	12·64	—
Glenelg	4·17	16·35	11·01	—
Magill	5·46	23·87	15·24	19·93

RAINFALL—*continued.*

Station.	For July, 1917.	To end July, 1917.	Av'ge. to end July.	Av'ge. Annual Rainfall
ADELAIDE PLAINS—*continued.*				
Glen Osmond ...	5·98	25·53	15·38	25·26
Mitcham	5·61	20·84	14·19	23·47
Belair	5·91	—	17·32	28·64
MOUNT LOFTY RANGES.				
Teatree Gully....	5·81	24·68	16·65	28·19
Stirling West ...	12·38	46·72	27·66	46·70
Uraidla	10·10	45·40	26·50	44·35
Clarendon	6·73	26·50	19·86	33·67
Morphett Vale ..	4·82	18·91	12·65	23·32
Noarlunga	3·92	18·17	12·09	20·28
Willunga	4·83	22·65	15·60	25·98
Aldinga	3·83	17·87	12·11	20·34
Normanville	5·20	17·46	12·74	20·65
Yankalilla.....	5·93	20·50	14·29	22·78
Cape Jervis	4·60	15·00	10·13	16·34
Mount Pleasant .	10·18	25·57	15·67	26·87
Blumberg	10·47	29·82	17·02	29·38
Gumeracha	9·91	32·95	18·60	33·30
Lobethal	13·11	27·34	20·60	35·38
Woodside	10·13	31·44	18·30	31·87
Hahndorf.....	10·53	29·12	19·98	35·45
Nairne	8·57	25·61	16·56	28·83
Mount Barker ...	9·83	31·53	17·97	30·93
Echunga	8·85	30·27	19·30	32·83
Macclesfield	7·68	26·40	17·51	30·72
Meadows	10·53	35·58	20·70	35·52
Strathalbyn	4·08	14·30	11·31	19·28
Myponga.....	5·33	—	—	—
Millbrook Reservr.	8·65	—	—	—
MURRAY FLATS AND VALLEY.				
Wellington	1·27	9·54	8·57	15·01
Milang	1·84	9·25	9·46	16·08
Langhorne's Brdg	1·38	—	—	15·27
Tailem Bend	0·90	11·00	7·98	—
Murray Bridge ..	1·34	7·73	8·12	14·32
Callington	2·75	10·79	8·91	15·65
Mannum	1·15	6·71	6·84	11·67
Palmer	4·19	12·12	7·80	15·60
Sedan	2·69	8·95	6·96	11·92
Blanchetown	0·64	2·83	5·95	—
Eudunda.....	3·57	11·05	9·77	17·33
Sutherlands	1·64	5·72	5·78	10·71
Morgan	1·34	4·57	4·91	10·60
Overland Corner .	1·42	6·31	6·17	—
Renmark	1·85	9·15	5·56	11·42
Loxton	1·41	10·23	5·33	10·93
Swan Reach	1·07	—	—	—
Waikerie.....	1·55	—	—	—
WEST OF SPENCER'S GULF.				
Eucla.....	0·75	7·74	6·50	10·13
White Well.....	0·92	7·79	5·31	9·67
Fowler's Bay ...	2·08	11·68	7·99	12·11
Penong	1·95	10·30	6·96	11·93
Murat Bay	2·23	9·51	6·09	—
Smoky Bay	1·86	9·97	—	—
Streaky Bay.....	3·38	14·80	9·76	15·31

Station.	For July, 1917.	To end July, 1917.	Av'ge. to end July.	Av'ge. Annual Rainfall
WEST OF SPENCER'S GULF—*continued.*				
Port Elliston	3·83	16·28	10·38	16 49
Port Lincoln	4·04	16·37	12·28	19·88
Tumby Bay	2·62	10·25	9·47	15·00
Carrow	3·08	15·38	—	—
Cowell	0·87	7·28	6·87	11 76
Point Lowly.....	1·38	8·26	6·47	12·21
Cummins	4·10	—	—	—
Arno Bay	1·84	—	—	—
YORKE'S PENINSULA.				
Wallaroo.....	1·81	10·30	8·76	14·06
Kadina.....	2·31	11·63	9·79	15·88
Moonta	1·93	11·68	9·61	15·22
Green's Plains ...	2·79	11·41	9·32	15·73
Maitland	2·56	16·10	12·25	20·08
Ardrossan	1·30	9·81	8·35	13·89
Port Victoria ...	1·80	12·26	9·42	15·21
Curramulka	2·52	14·69	11·07	18·50
Minlaton	3·02	16·42	10·56	17·41
Stansbury	2·60	16·24	10·19	17·66
Warooka	3·89	16·89	10·76	17·71
Yorketown	3·60	15·07	10·37	17·47
Edithburgh	3·43	15·49	10·04	16·48
SOUTH AND SOUTH-EAST.				
Cape Borda	5·48	17·63	16·27	25·09
Kingscote	4·59	15·96	11·76	18·95
Penneshaw	4·02	13·57	13·41	21·34
Cape Willoughby..	4·32	15·20	11·82	19·69
Victor Harbor ...	3·62	16·62	13·09	22·18
Port Elliot	3·67	15·88	11·96	20·33
Goolwa.....	2·74	14·70	9·70	17·93
Pinnaroo	2·03	9·25	8·15	16·74
Parilla	2·32	9·51	—	—
Lameroo	2·18	9·76	8·84	16·55
Parrakie	1·62	9·45	7·32	—
Geranium	2·11	11·61	7·53	—
Peake	1·63	11·79	8·79	—
Cooke's Plains ..	1·63	11·92	8·34	14·74
Meningie	3·35	14·68	—	—
Coomandook	2·45	14·20	9·85	16·80
Coonalpyn	3·26	14·63	9·90	17·49
Tintinara	2·98	13·98	10·23	18·78
Keith.....	2·69	13·28	10·00	—
Bordertown	4·22	15·32	10·78	19·76
Wolseley	5·41	14·09	9·69	17·72
Frances	3·67	13·20	10·84	20·74
Naracoorte	6·83	17·01	12·72	22·60
Penola	7·41	20·15	14·02	26·78
Lucindale	6·25	17·77	13·27	23·32
Kingston.....	7·18	20·45	14·92	24·73
Robe	7·73	18·50	15·30	24·69
Beachport.....	6·96	19·48	17·35	27·51
Millicent	7·31	20·72	17·86	29·25
Mount Gambier .	6·20	20·24	18·35	32·00
C. Nrthumberland	6·80	19·45	15·85	26·63
Kalangadoo	7·26	—	—	—

AGRICULTURAL BUREAU REPORTS.

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Balaklava	‡	—	—
Beaufort	*	—	—
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Berri	‡	1, 29	—
Blackheath	*	4	1
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Bute	74	—	—
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Caltowie	*	—	—
Canowie Belt	*	—	—
Carrieton	†	—	—
Carrow	†	—	—
Cherry Gardens	‡	28	25
Clanfield	78	—	—
Clare	*	—	—
Clarendon	85	27	—
Claypan Bore	†	—	—
Colton	*	—	—
Coomandook	*	—	—
Coomooroo	*	—	—
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Gumeracha	*	—	—
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Kadina	*	—	—
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Kanmantoo	85	25	29
Keith	*	—	—
Ki Ki	‡	—	—
Kingscote	*	—	—
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Loxton	*	—	—
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Mount Bryan East	‡	—	—
Mount Compass	*	—	—
Mount Gambier	†	—	—
Mount Hope	‡	—	—
Mount Pleasant	*	—	—
Mount Remarkable	†	—	—
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Myrtla	*	—	—
McNamara Bore	*	—	—
Nantawarra	73	—	—
Naracoorte	91	—	—
Narridy	†	—	—
Narrung	*	—	—
Netherton	†	—	—
North Booborowie	*	—	—
North Bundaleer	*	—	—
Northfield	*	2	4
Orroroo	*	—	—
Parilla	*	—	—
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Parrakie	†	—	—
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Port Germein	*	—	—
Port Pirie	*	—	1
Quorn	*	—	1
Ramco	†	—	—
Redhill	71	28	25
Renmark	79	—	—
Riverton	*	—	—
Roberts and Verran	‡	—	—
Rosenthal	‡	1	5
Rosy Pine	82	—	—
Saddleworth	*	—	—
Salisbury	*	—	—
Salt Creek	†	—	—
Sandalwood	‡	—	—
Sherlock	‡	—	—
Spalding	*	—	—
Stockport	*	—	—
Strathalbyn	†	28	25
Sutherlands	*	—	—
Tantanoola	98	4	1
Tarcowie	67	28	25
Tatiara	†	4	1
Tintinarra	*	—	—
Two Wells	†	—	—
Uraidla and Summert'n	†	6	3
Waikerie	*	31	28
Warcowie	68	—	—
Warrow	†	—	—
Watervale	‡	—	—
Wepowie	68	25	29
Whyte-Yarcowie	*	—	—
Wilkawatt	82	—	—
Willowie	†	28	25
Wilmington	68	—	—
Wirrabara	*	—	—
Wirrega	*	—	—
Wollowa	83	—	—
Woodleigh	*	—	—
Woodside	*	—	—
Wynarka	†	—	—
Yabmana	*	—	—
Yacka	‡	—	—
Yadnarie	76	—	—
Yallunda	*	—	—
Yaninee	†	—	—
Yeelanna	77	—	—
Yongala Vale	72	31	28
Yorketown	*	—	—

*No report received during the month of July. † Formal report only received.
‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Date of Meeting—August 8th and Sept. 12th, 1917.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

MEMORANDA FOR THE MONTH.

PINNAROO LINE BRANCHES CONFERENCE.—Branches situated on the Pinnaroo line of railway will meet in conference at Pinnaroo on Wednesday, August 29th. The Minister of Agriculture has been invited to open the proceedings. Addresses will be delivered by the Director of Agriculture (Professor Arthur J. Perkins), who will deal with the subject "Sheep on the Farm," and by the Poultry Expert (Mr. D. F. Laurie). Papers dealing with questions of agricultural interest will be contributed by members of the different Branches.

SPECIAL TRAIN.—For the convenience of delegates special train accommodation has been arranged to leave Tailem Bend on Wednesday, 29th, at 3.5 a.m., stop at all stations en route, and reach Pinnaroo at 9.32 a.m.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

MORCHARD (Average annual rainfall, 11in. to 12in.).

June 2nd.—Present: 15 members and five visitors.

FEDERATION WHEAT.—Mr. M. R. Jasper read a short paper on this subject. He contended that Federation was the best variety of wheat any farmer could grow for grain. Besides stooling out well it did not grow very high, and in rough weather did not shake out nearly so easily as several other varieties. In the discussion which followed, opinions were divided. Messrs. Gregory, Reichstein, and Cox each favored Federation. Mr. F. Scriven preferred Red Indian. Mr. H. Brown said Federation was a failure on dirty land, but Silver King had done well. Neither Mr. Kitto nor Mr. Swigden favored Federation. The latter member spoke in favor of Yandilla King and Marshall's.

SHARE FARMING.—In a paper dealing with this subject, Mr. H. D. Tilbrook said a fair amount of the land in the State was worked on the share system. Under the usual terms the land was let on halves, the owner finding seed wheat and half the super., while the other partner provided half of the super. and all the working plant and labor. Each partner was to find his share of cornsacks and take half of the crop. Under present conditions the speaker considered that share farming was not very remunerative to the working partner. In discussing the paper, Mr. W. Twigden considered that the share farmer was very often at a loss in the North, as crops did not yield too well.

TARCOWIE (Average annual rainfall, 15¼in.).

July 5th.

THE REAPER-THRESHER.—In a paper dealing with this machine, Mr. J. P. Smith said the reaper-thresher was light in draught, and would do good work in crops that otherwise one would be unable to deal with. One of the principal features of the machine was its ability in harvesting tangled and broken-down crops. The heads of the wheat were cut off, and then went through the ordinary process of winnowing. He had reaped 1,750 bags of wheat last season, and his machine had shown little or no signs of wear. In discussing the paper, Messrs. Kotz and

Symons thought the machine too cumbersome, but were of the opinion that the reaper-thresher was a splendid saver of tangled crops. Mr. Burgess also considered the machine a great saver of wheat.

WARCOWIE (Average annual rainfall, 12.16in.).

July 12th.—Present: nine members and two visitors.

RABBIT DESTRUCTION.—Papers were read on this subject by Messrs. A. and B. Crossman. In discussing the papers, Mr. G. Growden said he had found ploughing the burrows in the summer very effective. Mr. Feineler thought a good plan was to plough a furrow and allow water to run into the burrows. Mr. T. Donellan had found running water into the burrows very effective, but noticed they were always reopened after the land had dried.

WEPOWIE (Average annual rainfall, 13in. to 14in.).

June 30th.—Present: 10 members and one visitor.

WORK ON THE FARM.—A paper on this subject was contributed by Mr. S. Fogden. He said good management was essential on the farm. Attention should be given to horses and implements preparatory to commencing seeding or harvesting operations. If horses had to travel over rough and stony ground they should be shod, as their feet would not get tender so quickly. It was advisable to see that the chaff house was filled, as time was lost when one had to stop the teams to cut hay. It was a good plan to thoroughly overhaul such implements as the binder, drill, harvester, &c., when operations were finished, as those implements if put away in need of repair until the following season would in all probability be forgotten, which meant delay in starting work. He suggested that previous to carting wheat one should arrange to have the super. at the station, that would save an extra journey into the railway station prior to commencing seeding.

WILMINGTON (Average annual rainfall, 18.26in.).

July 4th.—Present: 15 members.

ANNUAL MEETING.—The Hon. Secretary (Mr. B. Jericho) read the annual report, after which the election of officers followed. Mr. H. Duhring read a short paper on "Handling a Colt to be Put in Harness." He thought that only in extreme cases should a rope be used, and even then great care must be exercised, as there was a danger of choking the colt. He preferred the method of using a crush pen. A few hours each day would help to give the colt confidence that one was not going to harm him. He was a firm believer in working a young horse in the body of a wagon team; that would not interfere with the other horses of the team. Members generally agreed in the discussion which followed.

AMYTON, July 3rd.—ANNUAL MEETING.—The Hon. Secretary (Mr. T. Ward) presented the annual report, after which Mr. W. Gum initiated a discussion on the mice plague. He pointed out that unless some system of destroying that pest were effected, they would be worse next year. Other members were of the opinion that the mice would die out before doing much more damage.

HAWKER, July 3rd.—ANNUAL MEETING—The Hon. Secretary (Mr. J. Smith) read the report for the past year, and in reviewing the work that had been done, urged members to help create an interest in the meeting of the Bureau.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

July 2nd.—Present: 11 members and one visitors.

ANNUAL MEETING.—The Hon. Secretary (Mr. P. Curtin) presented the annual report, which showed that interest in the Bureau had been well maintained during the past session.

FALLOWING.—Mr. C. Cox read a short paper dealing with this subject. He considered one should start ploughing as soon after seeding as was possible, because the land then contained more moisture and worked down well.

RAISING FRUIT TREES.—In a paper on this subject Mr. J. Burton said fruit trees were propagated by various means—seeds, cuttings, suckers, grafting, and budding. Seeds were the source of new varieties, but only a few cultivators devoted themselves to the raising of these. Seedlings were raised in large quantities to supply stocks, upon which known and desirable varieties could be budded or grafted. Seedlings afforded better stocks than could be obtained in any other way, and they should be used as far as possible. The seedling would, in all probability, prove more vigorous and thrifty than a plant obtained from layers or cuttings. In certain cases, as, for instance, in propagating the apple, there were special reasons for departing from that practice in raising seedlings from stocks. Care should be taken, as far as practicable, to sow seeds of such kinds as were likely to give the best results. No precise directions could be given upon this point, but as a rule growers should avoid using seeds of any varieties that in their habit of growth possessed undesirable qualities, such as throwing up suckers, wanting in vigor, &c. It must also be remembered that with most of the cultivated fruit trees, varieties differed materially in growth and requirements, and that which might prove a suitable stock in one case, would be quite the reverse in another. Some stocks were better adapted to particular soils than others, as a rule strong, hardy varieties would give better seedling stocks for heavy or wet soils than varieties that were less vigorous, and he strongly advised growers to experiment with seedlings from various sources as stocks. Some fruit trees could be propagated by cuttings, and some kinds were commonly raised by that method, such as the grape, fig, mulberry, and quince. All these fruits could be obtained from cuttings, but in the case of other kinds growth was too slow and weakly to allow that method to be utilized. Grafting was one method adopted in the propagation of fruit trees, and more especially those having pips, such as apple, pear, and orange. By grafting, the cultivator was enabled to establish a particular kind of fruit upon a plant of another variety. The theory of grafting was based upon the power of union between the young tissues of the stock, or rooted plant, and the scion or branch that was worked upon it. When those parts were in perfect contact, the ascending sap of the stock passed into the scion, which was excited into activity, and a perfect union formed. It should be understood, however, that the union did not extend over the whole surface of the cut stocks and scions, but only at the points where the sap exuded between the wood and the inner bark. Consequently the success of the operation of grafting depended upon the smoothness of the cut portions of stock and scion, and the accuracy of the joining. There must be an exact meeting of the inner barks of the two or otherwise the union would not be perfect, and the scion would die. Grafting allowed the grower to improve old trees of inferior varieties by working better sorts upon them; it enabled the grower, as in the case of blight-proof apples, to utilize particular stocks that were disagreeable to insects; it enabled the grower to obtain dwarf trees, as in the case of apples worked upon the Paradise, and the pear on quince stocks. There were a great number of ways in which grafting could be effected, but the same principle applied to each one. The variety of methods was due mainly to the differences in the sizes and ages of the stocks, and no practically useful purpose would be served by describing all the modes of grafting that were practised. Splice or whip grafting was one of the most simple forms, and could be practised where the stock and scion were equal in size. All that was necessary was to make a perfectly smooth cut, slanting upwards, in the stock, and a corresponding one downward with the scion, to make the two fit. Bind the two firmly together, with a strip of calico or other material that would answer the purpose, and cover with grafting wax, or clay, to exclude the air. That was a very sure and neat way of grafting. Cleft grafting was a mode commonly used for large stocks or trees that had been cut back, and whose branches were too thick for splice grafting. The scion was prepared by sloping the lower portion in the form of a wedge about 2½in. long, taking care to make a smooth surface, and keep the bark perfect on the side that was to be outward. The cleft was then opened with a chisel and mallet, and the scion carefully pushed into its place, taking care that its inner bark fitted that of the stock. One or more scions might be inserted upon the one stock, according to its size. Saddle grafting was very popular. It was

performed by cutting the top of the stock in order to form a wedge, splitting the scion in the centre, and paring the inner parts to make two tongue-like pieces. Those were placed astride the stock, secured by tying, and covered with grafting wax. That mode afforded the largest surface for the union of stock and scion, and the latter had a firm hold. It was best adapted for stocks and scions that were equal, or nearly so, in size. Root grafting was practised on apples, which necessarily were worked on blight-proof stocks that could not be obtained from seedlings, as with other fruits. Pieces of the roots from 3in. to 5in. in length were used, and were simply splice or whip grafted. The best time to graft deciduous trees was in the latter part of the winter or early in the spring, just before active growth commenced. The time would vary to some extent according to the climate and other local conditions. Budding was merely a form of grafting in which buds were used as scions, instead of branches, as in other methods. By budding the grower could attain precisely the same objects as by the ordinary modes of grafting. Stone fruits were more usually budded than grafted, as they took more freely. Budding was also largely practised with oranges and lemons, and was preferable to ordinary grafting. It might also be successfully practised with other trees. The most general method was called shield or T budding, which was effected by making a straight cut in the bark of the stock an inch or more long, and at the top a cross cut, so that the whole would form a T. The bark was then raised from the top with the handle of the knife for the reception of the prepared bud. The operator, taking hold of the leaf, pushed the bud gently down as far as was necessary, and the knife was withdrawn. The bark was closed down around the bud, and bandaged with budding cotton or other suitable material, both above and below the bud. Buds were cut with a sharp knife from the stems, with a portion of the bark and a thin piece of wood attached. The top of the bark was cut square, and the inner slip of wood removed excepting a little near the bud. Care should be taken that the eye or bud was not injured when the wood was removed, and if so, it should be rejected. In a few weeks the buds should have taken, which would be evidenced by their beginning to swell. The bandages should then be loosened, to allow of growth. Care should be taken to select buds from trees that were perfect in character; imperfect, immature fruit buds should be rejected, leaving only single wood buds for use. In budding, the more smartly the work was done the better, as quick manipulation was one of the essentials to success. The proper time for budding was when the bark of the stock would separate freely from the wood, and the buds were plump and well developed. The time for budding would vary to some extent according to the nature of the trees, locality, and season, but as a rule the work could be started about midsummer, and continued until the bark ceased to lift easily.

BOOLEROO CENTRE (Average annual rainfall, 15.83in.).

June 29th.—Present: nine members and one visitor.

THE BENEFITS OF THE AGRICULTURAL BUREAU.—This was the subject of a paper read by Mr. J. M. Carey. He said the Agricultural Bureau was a centre through which sound and practical information could be readily obtained, and was therefore deserving of the fullest support every farmer could give. The Bureau was a means of bringing together men who were desirous of learning, and keeping them in touch with the views and experiences of the experts. He considered the Bureau a most valuable institution. Especially did this apply to the younger members of the Bureau, who could learn a great deal by taking a lively interest in the doings of the Bureau with which they were connected.

BUNDALEER SPRINGS.

July 4th.—Present: 14 members and two visitors.

GARDENING.—In an address on this topic, Mr. J. A. Gerke, after having illustrated the method of pruning which he considered was most suitable for that district, strongly advised the spraying of all trees to combat codlin moth. He considered green manuring the best for an orchard; stable manure was not so beneficial. Summer pruning was not advised, but Mr. Ellis considered it of advantage on certain varieties of trees that had a tendency to lean over through the pressure of the prevailing south-west winds in the exposed positions.

MINTARO.

June 2nd.—Present: 23 members and 21 visitors.

ANNUAL MEETING.—The Hon. Secretary (Mr. E. A. Scarfe) read the annual report, and the election of officers followed. The subject for the evening "How to Make Farm Life More Attractive" was introduced by the Chairman (Mr. D. Kelly) and a good discussion took place. The latter portion of the meeting took the form of a social evening.

MINTARO (Average annual rainfall, 21.99in.).

June 30th.—Present: 16 members and two visitors.

MIXED FARMING.—In the course of a paper on this subject, Mr. A. Low said:—"An area of 300 acres I would subdivide as follows:—Three 90-acre paddocks and five six-acre paddocks, in one of which should be the homestead buildings, stockyards, fruit and vegetable garden, and lucerne patch, with a supply of water suitable for stock and irrigation. A three-years' rotation system could be adopted for the larger paddocks, in 90 acres wheat or oats, 90 acres pasture, 90 acres fallow. On suitable soil a light sprinkling of lucerne or clover seed could, with advantage, be seeded along with the wheat or oats. It will not harm the cereal crop, and will very much improve the stubble feed, also the pasture the following year. The small paddocks may be used for growing summer green feed for the stock, such as barley, rape, peas, kale, mustard, maize, sorghum, sugar cane, vetches, &c., all of which may be fed green, or, if not just required at the time, may be cut and fed dry, as wanted. The stock should be the number of horses required as motive power, including one or two brood mares to supply the wear or losses; six cows of a breed that will be likely to produce good utility stock. Two or three goods sows should be kept, as at times there will be surplus skim milk, green feed, and poor or damaged grain, and the porker, with fair attention, always pays for his feed. About 100 to 200 fowls of any heavy breed are most suitable, as they are less destructive than light breeds. Fifty to 100 ewes may be kept, and at present high prices for wool and mutton are the stock that give least trouble and the best return. To keep the above stock it will be necessary at times to hand feed, and mostly all that grows on the place will be required to do so. The greater part of the crop should be cut and stacked, either to be thrashed or chaffed, and any crop that may be reaped. The straw should be carefully secured as early as possible after reaping, and may be chaffed and fed to cows or sheep with ground grains, bran, or pollard. Cocky chaff may also be treated the same way. There should be no burning or wastage of straw; that which is not used as feed may be used as litter in the stockyard. The manure should be regularly cleaned up and put in a pit, where it may be kept moist and allowed to rot and become suitable to return to the soil, and will be found to be very valuable, especially on the small paddocks, for the growing of green feed." In discussing the paper, Mr. Kelly said that farmyard manure should not be applied to land intended for wheat growing. Mr. Jacobs pointed out that the labor difficulty could be overcome by having smaller holdings. Mr. J. Thomas said cows and poultry paid him well, and he would not be without them on the farm.

REDHILL (Average annual rainfall, 16.79in.).

June 7th.—Present: seven members and one visitor.

FALLOW AND CULTIVATION.—Mr. W. L. Pengilly, in a paper dealing with this subject, said the main idea after harvest was to clear straw off land that was to be fallowed in winter. That practice resulted in the burning of the stubble, which was a waste, and also destroyed humus. A stubble paddock lying idle would take several years before the straw had sufficiently decayed to be utilised as food for the wheat crop. Paddocks not worked for several years would be overrun by weeds, and to that point farmers would have to give consideration. Wild turnip was at present a menace in the district. To destroy weeds one must fallow every two years. That meant that the stubble must be burned. The land should be lightly worked immediately after the fire, either with hook harrows or the cultivator, which would cover the seeds sufficiently to cause them to germinate with early rains, and to retain ashes that otherwise would be blown away. He did not recommend summer fallowing, as north winds took too much moisture from the land. It was unwise to attempt to fallow more land than the strength of the farm would permit. With a team of eight horses one could fallow 200 acres to 300

acres and work it well. The best-worked fallow would grow the best crops, providing rust, &c., did them no harm. The depth of ploughing varied in accordance with the nature of the soil, the average depth being about 4½in. The plough should be cutting a clean furrow and turning the weeds in. Fallowing when completed should be immediately cross harrowed. The harrows were one of the best implements to work on the fallow, destroying as they did many weeds, and keeping the land in a fine mulch, thus enabling it to withstand the trying summer months.

CRYSTAL BROOK, June 2nd.—A paper dealing with the mice plague was read by Mr. W. J. Venning. A good discussion on this topic followed.

LAURA, June 27th.—The 13th annual meeting of the Branch was held on Wednesday, June 27th. The chair was occupied by Mr. R. Lines, and in addition to a large number of members, the Dairy Expert (Mr. P. H. Suter), and the Acting Secretary of the Advisory Board (Mr. H. J. Finnis) were present. The proceedings took the form of a social gathering, and after the loyal toast had been submitted by the Chairman, Mr. H. R. Lines proposed "The Advisory Board of Agriculture and the Agricultural Industry." He referred in eulogistic terms to the work done by the Advisory Board, and of the staff of the Department of Agriculture. The sentiment was replied to by Mr. Finnis. The toast of "The Dairying Industry" was in the hands of Mr. P. E. Bowker, who mentioned the suitability of the Laura district for dairying, not only on account of the soil and climatic conditions, but also in view of the proximity of markets for dairy produce at Port Pirie, and Broken Hill. He also urged the appointment by the Government of itinerant instructors. The Dairy Expert (Mr. Suter) responded. "The Laura Branch" was proposed by Mr. H. J. Finnis, and responded to by Mr. R. J. Rose (Hon. Secretary). In the course of an interesting speech Mr. Rose referred to the very instructive work done by the Branch since its inception. The toast "The Visitors" was in the hands of Mr. F. T. Hughes, and "The Health of the Ladies" was drunk at the instance of Mr. G. Bundey, and supported by Mr. J. Acott. Mr. E. G. Blesing responded on behalf of the ladies.

PORT BROUGHTON, June 29th.—The Chairman (Mr. F. E. Pattingale) initiated a discussion on the topic of crutching sheep. He favored crutching sheep early in winter season, as if left later the value of the wool deteriorated very considerably, also disease caused by flies was likely to be greater. Mr. R. Allchurch favored crutching, but on account of shortage of labor was at present unable to do so.

YONGALA VALE, June 9th.—Mr. B. Battersby read a paper on the care and use of farm implements. Mr. W. C. Wright also gave a short address on irrigation.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT)

LONE PINE.

July 2nd.—Present: 21 members and five visitors.

THE CARE OF FARM IMPLEMENTS.—In a paper dealing with this subject Mr. J. A. Butterfield said the first essential point for the farmer to consider was the necessity for providing ample accommodation for housing the implements. A shed should be constructed with a sloping roof to allow the water to run off freely. On many occasions one noticed farming implements standing out in all weathers. The damp air, rain, &c., ruined the wood and ironwork, which would mean more expense in repairs and loss of time when the implements were needed again. Implements such as the harvester and binder, which were very complicated, would, if left out in the weather, be a source of trouble and expense. That could be remedied by keeping them under cover. Traps, drays, &c., left out in the open gave the farm a very untidy appearance, and pointed out the carelessness of the owner. The use of the spanner on all farming machinery tended to a large extent to lengthen the life of the machine. All machines required lubrication, and he strongly advised the man who worked them to make a frequent use of the oil

can on all bearings, &c., and those parts, if not properly looked after, very quickly cut out. Again, many farmers neglected to provide cover for the harness; it was left out in the weather, which made it hard and brittle. Members in discussion unanimously agreed with the speaker.

NANTAWARRA (Average annual rainfall, 15.90in.).

June 28th.—Present: 10 members.

SIDE LINES ON THE FARM.—Mr. P. Nottle read a short paper on this subject. The increased cost of machinery, materials, and higher rates of wages made it essential for every farmer to increase the output of the farm, he said. While the land in that district was not suitable for intense cultivation farmers could pay more attention to the production of profitable side lines. If the stubble were burned and oats and barley sown sheep could be paddocked on those crops until September, and then if desired they would still be found to yield a profitable cut of hay, which could be utilised in hand feeding of the sheep. By that means he considered that the average farm would carry twice the number of sheep that it was at present capable of providing for. In discussion, Mr. W. Smith did not think the growing of forage crops would pay on account of the expense caused thereby. The paddocks would have to be made smaller and the fences sheep proof.

GAWLER RIVER, June 2nd.—BULK HANDLING OF WHEAT.—Mr. S. Davis introduced this subject in a paper, in which he compared the present system and the proposed bulk handling. A good discussion resulted.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BRENTWOOD.

May 31st.—Present: 12 members and one visitor.

FALLOWING.—In a paper on this subject, Mr. F. Nation, taking as an illustration two paddocks, each consisting of 100 acres of land, said it was first of all necessary to see that the land was free from stones, bushes, &c. He preferred an 8-furrow stump-jump plough, which cut 7in. furrows. When 50 acres were ploughed he suggested that the harrows should then be put over the land, as the best results were given when the harrows were kept close behind the plough, and he would continue the same system until the 200 acres were fallowed. He considered the next step was to cross-harrow both paddocks, and then plough them back, not so deep as the previous working, but with sufficient depth to cover all rubbish. The fallow could then be left with the sheep on it until seeding time. In working sandhills or patches that were inclined to drift, he thought more harm was done by the harrows than the plough. A good plan was to drill sorghum on the moist places, which, besides preventing the land from drifting, provided splendid fodder for stock. In discussing the paper, Mr. Newbold considered the spring plough suitable for stubble land, but gave preference to the bridle plough for heavy fallowing or all round work. He agreed with the writer of the paper in regard to the harrows. Although of late years he had used a skim plough for turning fallow back with good results, yet he strongly advocated crossing fallow with the cultivator. Mr. J. Twartz favored the fixed harrows in preference to others, as he considered they worked the soil better. Mr. J. J. Honner said a good deal of the trouble in ploughs pulling up stones was caused by blunt plough shares or not oiling the jumpers. Mr. Siebert had found that a better germination resulted on fallow which had been rolled. In reply Mr. Nation said that the bridle plough was much rougher on horses, and in this district pulled up too many stones. Harrows were just as effective as a cultivator for cross working the fallow. In good land set harrows did good work, but for stony land the jump harrows were best. He had found that rolling was not suitable for all classes of land, as it often caused light soil to drift.

BRENTWOOD.

July 12th.—Present: 16 members and three visitors.

ANNUAL MEETING.—The Hon. Secretary (Mr. G. L. Tucker) read the annual report, and the election of officers took place. Mr. W. Alderman then read a paper on "Breaking in Draught Colts." He thought the best age to commence breaking the animals in was when they were three and a half years old, as they could then stand a fair amount of work. The best method was with the crush pen, but another good way was to bring them up with the whip. That might take some little time, but it was time well spent, as they would always keep their head and not their hindquarters towards one. When tying a wild colt to a post one should first place a piece of bag around the neck, and then tie the rope over the bag. The winkers should be gradually worked on along the neck until the colt was used to the feel of them. Then take a strong piece of light rope and tie securely to both rings of the bit. In that way one could teach the animal to guide. To teach it to pull a weight could be done by attaching a log to two long chains, and driving it around a paddock. The best place in the team to work a young colt was next to near side, and between two quiet horses, with ropes from each horse's neck on to the bit of the colt. Care should be taken not to overwork the horse at the commencement, half a day each day for a week being ample, and one should also carefully look to the fitting of the collar. After the colt had finished working his shoulders should be washed with clean, cold water. That would help to make the shoulders hard. On no account should the horse be knocked about, or have too much whip, that would only tend to make him sulky. Mr. C. Boundy agreed mainly with the views expressed in the paper, but thought half a day too long to work colts at first. He favored only a round or two until the shoulders set. Mr. J. J. Hoover thought it a good plan to tie up with a head stall for seven or eight hours at first. He concurred in regard to the whip. Mr. T. Haywood thought it better to use an open bridle instead of winkers when breaking in, as a precaution against the young horse getting frightened in case of the winkers coming off through accident. Mr. H. L. Martin had found that colts did not rear so much with winkers as they did with the open bridle. Mr. J. Alderman concurred in regard to winkers being better. He favored placing the colt at first third to the near side, as it was better for turning corners, having no rein on it. Mr. C. Newbold considered it a good plan to tie up the colt for a time. He agreed with the paper in respect to the colt's position in the team. In reply, Mr. Alderman said half a day might be a bit too long for a start, but he had experienced no shoulder trouble through that. His practice was to tie a colt up with a bran bag round its neck, and a rope attached to that. He favored winkers, to prevent the colt seeing too much. He considered it better to place the young horse as stated in his paper, because then the driver had more control over the colt going forward

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BUTE (Average annual rainfall, 15.42in.).

June 28th.—Present: 14 members.

TAKEALL.—Mr. D. McEnvoy, in submitting a paper dealing with the subject of "Takeall" suggested two causes from which he thought the trouble might arise. A lengthy discussion followed the reading of the paper, in the course of which Messrs. H. W. Paterson, J. French, and M. R. Hall expressed their opinions. Mr. S. Trengove suggested good fallowing and working the fallow well as preventive measures. The annual report of the Branch was read by the Hon. Secretary (Mr. L. E. Simon).

WESTERN DISTRICT.

CUMMINS.

July 7th.—Present: 11 members and one visitor.

KEEPING SHEEP ON THE FARM.—Mr. R. H. Siviour contributed a paper on this subject. He advised that one intending to keep sheep should make provision for the winter months by cutting a large stack of hay with which to hand feed the sheep. He was in favor of Crossbred sheep for that district, but in the event of keeping that type of sheep it was necessary to have very good fences. Small paddocks, with a supply of water in each, were preferable. During summer it was essential to have an abundance of water; feed might be scarce, but if the

animals had sufficient water, they would not lose so much condition. Members, in discussing the paper, generally agreed with the speaker's views. Mr. J. Durdin thought that district was well suited for sheep; he had killed a 16-months-old sheep which weighed 85lbs. dressed.

KOONIBBA.

July 7th.—Present: 11 members.

FARM CONSTRUCTION.—In a paper on this question, Mr. Lutz thought that a farm comprising 1,200 acres was quite large enough for one man to work and keep in order. Each year an area of 300 acres should be fallowed, and the remaining portion left for grazing purposes. The homestead should be built on a hill or rising ground. He considered it a mistake to clear all scrub off the land; a portion should be left as a background for the house and sheds, and also as a shelter for stock. Care should be taken not to leave the implements at the mercy of the weather, but to have a shed built in which they could be kept. He preferred an iron roof on the stable to straw, as there was a danger of fire from the latter. Members, in discussing the paper, thought that the iron roof was too hot in summer and too cold in winter.

KOPPIO (Average annual rainfall, 22.40in.).

June 5th.—Present: eight members.

WATTLE CULTURE.—Mr. C. Barraud contributed an interesting paper on this subject. He said numerous kinds of wattles were grown in the State, but the two most suited for the tanning industry were the *Acacia pycnantha*, commonly known as the broad leaf or golden wattle, and *Acacia decurrens*, the feather leaf or black wattle. To germinate the seed one should pour boiling water on it, and allow it to remain in the water one night. The seed would be ready for sowing when dry. It was advisable to sow about 4lbs. of seed to the acre, which would roughly mean one plant to every square yard, and also allow for sundry losses by frost, heat, and rabbits. The golden wattle had given as much as 45 per cent. tannic extract, which represented about 30 per cent. tannic acid. Those classes of wattle were the two most required by Victorian and South Australian tanners. The black wattle contained 20 to 30 per cent. tannic acid, but was a much larger tree, producing more bark, which equalised the value of the trees. The golden wattle thrived on almost any class of ground, but the black wattle needed rich and well-drained soil. The timber being tall and straight was very useful in the outbuildings on the farm. When six years old the trees were ready to strip. The bark was richest in tannic acid from September to December. The correct time to strip could be ascertained from the bark at the foot of the tree, which commenced to crack, and the crack extend up the tree. The young trees should be pruned; that would give a larger trunk to the tree and enable stripping to be done much more easily. It was pleasing to know that the wattles grown in the Adelaide hills were considered second to none in the product of tannic acid. Years ago bark was purchased at £2 10s. per ton, the price now ruling was £7 10s., while the ground article was worth £10 per ton. Notwithstanding the high duty of 30s. per ton put on bark imported from South Africa, a large quantity of that bark was imported every year. That was a result of the shortage of labor in most of the Australian States, hundreds of tons of bark being left on the trees for the want of strippers. In connection with bark from this district, an important factor, and one which on no account should be overlooked, seeing that the bark had to be shipped, was the secure tying of the bundles. That would avoid much loss to the growers. In discussing the subject several members remarked that wattles grown in the district were very much larger than those they had seen in other parts. It was agreed that many of the rough portions of the land in the district would grow wattles well, and the growing of wattles would pay, for the timber alone.

MINNIPA.

July 7th.—Present: four members and one visitor.

Homestead Meeting at Mr. G. V. Lindquist's Residence.

BUILDING TANKS FOR WATER CONSERVATION.—In a paper on this subject Mr. McPherson said one should choose as a site for building a tank a piece of land that was free from trees and bushes, and also one from which any water that over-

flowed would run clear of the tank. Excavation could be done with a shovel, but the use of an earth scoop and horses would save time and labor. He recommended the use of a "buckboard" in small tanks, say, with a capacity of 40,000galls., as that enabled one to scoop close to the sides and ends, until there was only a small quantity of earth to be taken out with a shovel. If the tank were to be built of masonry or of concrete, with the aid of boards, one could have the sides perpendicular; but if one were building with concrete, and not using boards, a batter on the sides of 1ft. in 3ft., or even more, would be of valuable assistance, as the concrete would lie on the sides, and be less liable to sag. For a concrete, the proportional parts, one of lime, two of stones, and two of sand, should be well mixed together and spread out, forming a circle. Then add water by pouring it in the centre. It should be mixed thoroughly, and one should commence to build the wall by putting the concrete on about 4in. to 6in. in thickness with a square-mouth shovel. Care should be taken not to batter it more than once or twice with the back of the shovel, or it would sag. All stones that were too large to go in the sides could generally be put in the bottom, and made to fit by being rammed after the concrete had set slightly. For cementing, the proportional parts were one of cement to three of sand. These should be put through a fine sieve, and mixed with water until pliable. A box about 2ft. 6in. square, and 1ft. deep, should meet the requirements for mixing in. Cement put on ¼in. thick, with a trowel, would be quite thick enough. He recommended the wall being a little rough, and damped with water before putting the cement on. Cool and cloudy weather should be chosen for cementing. After cementing, it was well to go over the walls with a cement wash, tar, or tar and pitch, which would fill up all fine cracks. A tank should be covered to prevent evaporation and the heat cracking the cement; also fenced, to keep out all stock. In mending cracks in tanks, Mr. Lindquist advised the use of a mixture of boiled oil and cement. Mr. Godlee stated that he had found mutton fat and ashes very effective.

PENONG (Average annual rainfall, 11.93in.).

July 7th.—Present: six members.

THE HANDY MAN ON THE FARM.—Mr. E. Gravestock read a paper on this subject. He stated that a farmer, to be successful at the present time, should be able to execute his own repairs. He should have a knowledge of blacksmithing, masonry, saddlery, and carpentry. The blacksmith's shop was especially necessary, as it frequently prevented serious loss of time and expense. Sore shoulders could often be prevented if a farmer were able to stuff and line a collar instead of allowing a horse to work in a damaged collar. Members agreed with the ideas expressed in the paper. Mr. J. Stiggants stated that he had paid £40 to £50 yearly for repair work until he secured a blacksmith's outfit. He now executed all his own repairs. He considered £20 at least should be spent in purchasing the necessary tools.

YADNARIE (Average annual rainfall, 14.09in.).

June 30th.—Present: 10 members.

CARE OF HORSES' FEET.—A very instructive paper on this subject was delivered by Mr. G. B. Kobelt. He said it was important that farmers and horse drivers should bestow a certain amount of care and attention to the animals' feet. Under no circumstances did he think a horse should be allowed to work if it had tender feet. Horses that were continually working in sandy soil, and were growing too long a hoof, should occasionally have them trimmed into good shape. Especially did that apply to young horses. Given attention when young would, in all probability, save the horse from having bad hoofs as it grew old. Care should also be taken, when working a broadly yoked team, that one did not turn at too sharp an angle, as it caused the horses to tread on the feet of one another. He thought that the lameness of horses in a new mallee district, such as that was, was largely due to staking. That could in many instances be avoided by putting a strong piece of sole leather between the shoe and the hoof. Mr. J. E. Quick thought the idea of shoeing horses with galvanized iron very good. A horse of his was staked early in the season; he had shod him with a piece of iron under the shoe three months ago, and but for a brief spell of two days, had worked the horse continually ever since. He had a horse that was a ripper, and had to work a slow one alongside of it, with the consequence that the slow horse, in turning the corners, was continually treading on the fast one, and had caused a hard lump to

grow on the foot just above the coronet. He had tried several means of avoiding the injury, but nothing was of any use. Mr. A. Spriggs had had horses' feet staked through working new mallee and broom land—in fact, he had had no other sort of land to work ever since he had been on his own. He had only lost one horse through being staked. The process he followed was very simple. As soon as the horse was staked, cut away the hoof to get at the stake immediately; then saturate the wound with eucalyptus oil. Have a piece of string, well chewed and saturated with eucalyptus, and force into the stake hole; leave for a day or two, then follow again the same process, and the wound would eventually heal, and the horse could go to work under a week. He was of the opinion that a piece of old iron tank would be the best, as it would resist more pressure; but if left on too long would cause the hoof to rot, which would be worse than the stake. The worst corn that he knew of was caused through the inexperienced man cutting the bar of the foot away, thus causing the hoof to contract. Mr. J. H. Kruger thought that anyone could not be too careful with horses' feet. A pound of caution was better than a chest of medicine. He agreed with the writer that the feet should be carefully attended to if the horse was inclined to be tender. The Chairman agreed with the writer of the paper. He could not speak from experience, as he had had only one horse staked. Horses treading on one another could, to a very great extent, be avoided by using long couplings. Winkers that fitted very close down over the eyes were a great mistake, he thought. He found a very good preventive of sore feet, especially the coronet, was a hobblestrap, with the upper of an old boot riveted to it, and fastened round the foot.

ELBOW HILL, July 7th.—ANNUAL MEETING—After the Hon. Secretary (Mr. H. J. Wheeler) had read the report for the first session, Mr. A. O. Chilman read a paper on "Methods of Working the Farm with Present Shortage of Labor." In discussing the paper, Mr. A. C. Dawkins favored putting less land in for wheat, and keeping the farm well stocked with sheep and cattle. Mr. S. V. Wake preferred feeding stock on long hay to "cocky chaff." Mr. R. C. Wake considered the "drill-plough" a great saving in labor during seeding operations. Mr. H. J. Wheeler agreed with the views of the first critic.

YEELANNA, June 30th.—ANNUAL MEETING.—The Hon. Secretary (Mr. S. H. Wilkin) presented the annual report, and the election of officers then followed. The latter part of the meeting took the form of a Question Box. Mr. J. P. Cronin thought the best method of destroying foxes was to poison small birds and use them as baits. Members thought there was little danger of "take-all" developing in wheat sown on land that had lain idle for three years. Generally, members agreed that from 60lbs. to 80lbs. of super. per acre was the most profitable dressing for the district.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

BORRIKA.

July 7th.—Present: 19 members and three visitors.

FARM VEGETABLE GARDEN.—A paper with this title was read by Mr. Bonython. He said land intended for vegetables should be prepared with a dressing of old stable manure. The first planting should be onion seeds. These should be sown in rows 10in. apart, with 4in. or 5in. between the plants in the rows. During May and June cauliflowers and cabbages could be planted in rows 2ft. apart, 20in. apart in the rows. When the plants started to flower, they should be protected from the sun and frost with paper or by breaking leaves over them. Carrots and parsnips should be planted in May and June, in rows 10in. apart, and then thinned out to 3in. or 4in. in a row. If they should not grow large enough the first season, they could be left through the summer until the autumn rains, when they would make a fresh start, and be quite good until the next spring. Turnips and turnip-rooted beet should be planted during May and June, in rows 10in. apart, and 1ft. in the row. Lettuce should be 10in. apart each way, and peas could be planted in rows 2ft. apart. To have early melon and tromhone plants,

one should grow them on a hot bed, which was prepared by putting 3in. or 4in. of soil on 2ft. or 3ft. of stable manure, or the seeds could be germinated by putting them between two pieces of wet flannel on a plate, and kept in a warm room. The best variety of vegetables for that district was onions, cabbages, cauliflowers, turnips, swedes, carrots, parsnips, beets, and lettuces. It was risky to plant beans and potatoes, on account of the spring frosts. He had found a solution of one packet of extract of soap to 3galls. of water a most effective method of checking blight on vegetables.

CLANFIELD.

June 8th.—Present: five members.

Mr. J. Marshall read a paper giving useful hints to the man who intended selecting a draught stallion. He dealt with the good points, and also the disabilities that one should avoid.

FARM PESTS.—In a paper dealing with this question, Mr. F. G. Hoar said farmers of that district should pay more attention to the destruction of vermin, which were increasing with great rapidity. At the commencement of the year 1914 there were very few rabbits, but at present the numbers had increased enormously. An opportunity had been missed by them during the drought, and it was at that time he considered the poison cart should have been kept continuously at work, as the rabbits would readily take the baits. He thought farmers should co-operate and do all in their power to eradicate the pest. Sparrows also did a large amount of damage, and had increased in numbers during recent years. The speaker next dealt with noxious weeds, some of which had found their way to that district. That pest could easily be checked if members started at once to deal with them. He mentioned he had seen a crop of hay which was so ruined with star thistles that it was impossible to work it with bare hands. In conclusion, he urged members not to lose any opportunity of keeping that district free from vermin and noxious weeds. Mr. Wilkins tabled samples of wheat graded by Mr. Dunne, of Black Springs, which clearly demonstrated the necessity for the grading of all seed wheat.

LAMEROO (Average annual rainfall, 16.55in.).

June 2nd.—Present: 15 members and three visitors.

MOST SUITABLE WHEATS.—In a short paper dealing with this topic, Mr. F. W. Eime said the wheats he had obtained best results from were Yandilla King (first), Federation or Late Gluyas (second), Marshall's No. 3 (third). He gave preference to both Yandilla King and Marshall's for both heavy and light soils, but thought to obtain best results from Federation one should sow on heavy land, as it was more likely to be affected with "take-all." From a piece of land comprising 30 acres he had harvested an average of 29bush. to the acre of Gluyas' Late wheat. He recommended King's Early or Dart's Imperial as being very good for hay crops. As that district had been subject to "take all," he strongly advised farmers to sow oats in larger quantities than they had been doing of late seasons. He had not been troubled with smut during the 11 years of his experience in that district, and in that time he had used as a pickle for the wheat half bluestone mixed with half coarse salt. In reply to a question, Mr. Eime said, from experience, that Federation was not best suited to light soils.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

July 7th.—Present: 19 members and three visitors.

RABBIT DESTRUCTION.—In a paper on this subject, Mr. H. E. Frahn said he favored digging the rabbits out as the most effective method of destruction. Very few rabbits would be missed if one was careful to destroy side branches, and the burrows were filled in at the same time. He did not think it a good plan to poison rabbits when stock were in the vicinity, as there was the danger of them chewing the bones. February and March were the best months to trap in that district, as they had not then started breeding. The trap should be set as level as possible, with the plate well covered with sand. If the sand were dry a piece of paper should be first placed on the plate and the openings of the burrow closed in where

no traps had been set. The first round of the traps should he made about sundown, the second about 10 o'clock or midnight, and the third early in the morning. The rabbits should be skinned in early morning, but if it were practicable, it paid one better to send the animals to market.

CARE OF SHEEP.—In a short paper on this question Mr. G. H. Golgol said farmers should devote more time to the keeping of sheep, as they were at present a most profitable sideline. They should not be kept in the one paddock too long, but shifted occasionally. Crutching should be done during March, and at the same time one could cut any wool that was hanging over the sheep's eyes. A plentiful supply of water was essential for the sheep during the summer months.

MORGAN (Average annual rainfall, 9.29in.).

June 30th.—Present: seven members and one visitor.

ANNUAL MEETING. VINES ON CLAYPANS WITHOUT IRRIGATION.—The Hon. Secretary (Mr. W. G. F. Plummer) contributed a paper on this subject. He thought that many of the claypans in the surrounding areas would undoubtedly grow grapes. He had seen a flat about 20 acres in extent flooded, it was put in crop, had yielded well, even though no rain had fallen after, while fields adjoining that claypan were quite barren. He was of opinion that those places held enough moisture to ensure a good result from grape vines without irrigation. The moisture could be retained by keeping the surface soil loose and of a fine tilth. In discussing the paper, Mr. Pope agreed with the speaker, and had decided to plant some vines this year. Mr. Heppner had ground similar to that described in the paper on his farm, but he thought the land would need to be fenced with wire netting. Mr. Freyer did not agree with planting trees on claypans, as they stood in great danger of being inundated. Election of officers for the coming year then took place.

PARILLA WELL (Average annual rainfall, 16in. to 17in.).

Present: nine members.

FALLOWING.—Mr. J. L. Badman contributed a paper on this subject. Good fallow land, he said, was essential for the successful growing of wheat. He favored early ploughing, as it turned the weeds under, and any rubbish that started to grow afterwards could be dealt with by the harrows. During the last three years he had worked his fallow with the harrows only, and had harvested good results on each occasion. He believed in shallow but thorough working of the fallow, and did not think it wise to allow the land to stand idle too long after it had been ploughed. He attributed the prevalence of "take-all" in that district to a large extent to the methods adopted in working the fallow, and thought that with a better class of farming that disease could be greatly reduced. He realized that drifting had to be contended with, but thought that with the use of the harrows and sheep good results would be obtained at next harvest. Mr. F. A. Webster also contributed a paper on this subject. He dealt with the ploughing, and stated that clean fallow was essential, and the forerunner of successful wheat growing. He gave preference to the automatic release spring stump-jump plough as being most suitable for that district. Each jump lifted independently, and the pull was straight from the centre of the plough. The bridle plough had a tendency, in stiff ground, to swing around to the near side. First consideration should be given to the horses, and they should always be kept in good condition, if possible. He thought a five-furrow implement, with good sweeping mouldboards to ensure a complete turn over, would give good results, but care should be taken to see that each furrow cut out its share of land. Ploughing to a depth of 5in. on flat land, and 3in. on sandy soil, was, he thought, most suited for that district. All stumps could be carted off and the land made as clear as possible, ready for seeding operations.

RENMARK (Average annual rainfall 10.93in.).

June 21st.—Present: 30 members and two visitors.

THE PRACTICE OF PRUNING.—In a paper on this subject Mr. A. Young said before he had any experience in Mildura he had many opportunities of becoming acquainted with the system of pruning known as Luffmann's, which was in most respects based on the principle of the unstopped leader. On the river he had often

to renovate old trees which had for years been cut back every year, and forked in the head growth, so that the top of the tree was a rank scrub at the expense of the lower limbs; with the result that little or no fruit could be gathered from the ground and the fruit was of inferior quality. He did not advocate following any hard and fast rule in pruning trees. A pruner must know his trees and the strength of the soil to do justice to his pruning. Where one man secured excellent results from "long pruning" that system would be the ruin to another man's trees. Young trees in full vigor would stand long-pruning, but in after years when the trees had borne some heavy crops the system should be modified. Good results could not be expected from that system unless the land was always kept in good heart. And even then he thought an occasional cutting back would help to keep the trees fresh and in shape. In pruning he had followed the practice of forming a tree with 10 or 12 good leaders; always keeping them well spaced for an even distribution of sap and to let light into the tree to develop the inside wood. Starting a young tree with, say, three limbs, and doubling the number for the next two years, should give sufficient leaders. That would bring the trees to a bearing age, and the fourth pruning season should be the first one to let the leaders go unstopped, and then only providing the growth was strong. Peach and apricot trees, if growing strongly, should be only thinned and shaped inside and the leaders left unstopped or cut to a lateral and then left uncut. After that a pruner has to use his own discretion and study his trees. If the growth was still very strong and the land good, a repetition of the above treatment should be given, but if the trees showed signs of getting too willowy and spreading too much he believed in shortening the leaders to a suitable lateral and thus stiffening the tree. Trees needed shortening back occasionally to freshen them up, but he believed in cutting back to a lateral, as the sap was not then wasted in a strong upward rush of growth as was the case if cut to a growing point, but was used lower in the tree in the formation of fruiting laterals. The best way to tell when trees needed this shortening back was to notice whether the fruit was getting small or the growth looking sickly. When the laterals on peach trees had borne fruit they should be removed or shortened to a spur. Light laterals were the best fruit wood, and those should be left to bear; but the heavier ones should be cut back to throw growth for fruit wood the following year. In some cases it was better to remove the heavy laterals altogether. Apricots should be pruned on much the same lines as peach trees. All dead wood must be taken out at each pruning and the fruit wood balanced all through the tree. The apricot was a tree which should not be allowed to get too flat, as the limbs would sun scald. As apricots usually yielded heavily during alternate years the pruning season preceding the heavy crop year should be the time to give them a heavier pruning. The habit of bearing heavier crops on alternate years was noticeable in most deciduous trees. The uncut terminal as a system had been condemned by many who had tried it for having produced a lot of small fruit. That occurred mainly on the top of the tree, and to avoid that if the growth was good, the bearing laterals high up on the leaders should be severely thinned if the pruner did not wish to cut the leader back; but he preferred to cut back to a suitable lateral. Another point worth remembering was that many varieties shed a big percentage of their buds in the winter. The early varieties of peaches and nectarines especially would lose their fruit buds. Therefore those trees should be left till quite late in the season. He liked to see the blossoms bursting before pruning peaches and nectarines. The Elberta being a consistent heavy cropper could be pruned first. Briggs' Red May peach would shed badly. A good rule was to prune late trees first, and early trees last. The pear tree was one which has confused many pruners, and was a tree with which he had had a fair experience. In Gippsland one had very little trouble to get a good "spread" on trees, but under irrigation the tendency was for the growth to rush up in a close compact body in young trees. Therefore it was not a good practice to use the secateurs too freely till a tree was about three or four years old, or the result would be the forcing of more rank wood and useless inside lateral growth. At that age the centre of the tree should be opened up and the other limbs spaced, but that should not be done all at once, it being better to thin out year by year, at the same time spurring the laterals unless they showed fruit buds on the ends, when on young trees they should be left to bear and to give the tree some work to do. Other laterals should be spurred to about four inches; then they would develop two or three good healthy fruit buds. That treatment applied more especially to the

Williams Bon Cretien or Duchess, but more or less to all pears. On no account should leaders be cut back unless to a lateral and the nearer horizontal the lateral the better. Once a pear tree was bearing and well spurred throughout very little pruning was necessary, though a thinning out now and then would be beneficial, and if the trees were too lanky they could be headed back to laterals with advantage. Care should be taken to thin out clusters of fruit buds in the top of the trees; otherwise when the crop was on the weight on the ends of the limbs would cause many to break. He did not believe in allowing young pear trees to run wild for a few years, although too much cutting was worse than too little. Strong crossing limbs should be removed and limbs running up parallel should not be allowed to remain so, or it would be noticed later on there would be long spaces on these limbs of blank wood, and it was hard to get growth on these blank spaces. The apple was not grown much in Renmark, although some very good fruit was produced on the river. Apple trees would sun-scald badly in hot climates if long pruning was practised too much. Some trees he had pruned had to be cut back severely. They had been left unstopped for some years, and showed sun-scald on the north-west side of almost every tree. The cutting back forced new top growth, and had helped to shade the rest of the tree, and the trees had recovered very well. Apple trees were very easy to form to a good shape, but the most difficult part of their pruning was the spurring. The Jonathan and Five-Crown were two very easy trees to prune, also Cleopatra. Rome Beauty (a good variety) was one which needed special treatment. The laterals on a young tree of that variety should not be cut back till they bore fruit, as they formed fruit buds on the end, and if the lateral was spurred it would only make a fresh growth with a fruit bud on the end of the following year, and so on. Thus the fruiting was delayed. The orange tree was very often left unpruned for so long that it was likely to get out of hand, and the pruner was at a loss to know what to do. Young orange trees required constant attention, young shoots rubbed off the lower parts of the stems, and the growth of the tree kept well up. Crossing limbs should be removed, also all dead wood. The Washington Navel after bearing fruit for a few years commenced to show a lot of small dead wood, and that should be taken out at every pruning. Older trees needed a little thinning out to let light in. All water shoots should be removed as soon as they showed, for in time they would take the run of the sap from the limb they shoot from and put a tree all out of shape, and any fruit they may bear would be very coarse. If a tree was very dense and crowded there would be a lot of thinning out of dying and spent wood. Opening up the centre of an orange tree would cause a lot of rank water shoots to grow. Sometimes the inside of a neglected tree had to be opened up a lot, and water-shoots would be sure to show. They should be rubbed off at once, and the tree watched so that waste growth did not get going, or it would rob the tree of a lot of vigor. The Washington navel was a variety which spread to the ground more than others. That weeping growth should be cut up well clear of the ground, or when the trees were carrying a crop all the lower fruit would be rubbed and marked and not much better than culls. Each year it was necessary to keep the trees pruned in that way, as they would come down every season. Where growth rested on the ground there would always be a lot of dead wood, for the tree got too dark inside, and that was as bad a fault as having too much light. If a tree were too dark inside, fruit would not set well there, and that was where a lot of the best oranges came from. In reply to sundry questions, Mr. Young stated that he had found in practice that it was a mistake to cut pear leaders back to laterals too soon in strong soil, as they would throw out a forest of laterals that had to be cleaned out year after year. If the soil was not strong earlier cutting back must be resorted to, or long lengths of bare wood would be the result. Mr. Elsley commended the practice of breaking back long growth in the growing season. If the broken growth was left hanging the buds filled out and no new suckers formed. Mr. Basey remarked that many peach trees in Waikerie had their leaders turned off to laterals that were too flat, and Mr. Young said that a horizontal terminal was a mistake for the peach. The leaders should be reduced to laterals that were on the weak side, and if the ordinary laterals were too thick the strongest ones should be cut right out. He did not believe in leaving the terminals uncut the first year, though he had done so at a Berri demonstration. If laterals had been cut back once and had spurred some of these spurs should be left. It was not necessary to try and get entirely new wood each year. Mr. Basey said he had followed an American system for three years on a white peach tree, cutting the laterals clean out each year to

the base buds. The experiment had answered well, and the tree was growing splendidly. Mr. Agars desired information respecting the treatment of spurs on the Rome Beauty apple, and Mr. Young said that if the tree fruited the spurs would throw out buds at the base. The Jonathan required spurring. Mr. Howie, on Mr. Hatfield's advice, had cut back the leaders of Rome Beauty apple trees for several years, to keep them moving, until fruit spurs were properly formed. After that it was not necessary to cut them back. As against that, Mr. Basey remarked, Messrs. C. and A. F. Morant had always been troubled with die-back in their apple trees until they left off cutting them back. Mr. Young admitted that he had not had much experience with apples on the river. His practical work in Renmark had been mainly among vines. In reply to Mr. Hooper, Mr. Young said he believed in thinning out peaches to the space of a hand. Mr. Howie said it was necessary also to thin out the spurs in the case of the Early Crawford, which always tended to overbear. Mr. Hooper had found that Elbertas also required thinning, and Mr. Basey had tried thinning on a few of these trees. In his opinion half of the trouble with peach trees on the river was that they overbore when young. Mr. F. J. Olorenshaw had followed the Luffman system for years with peaches, always lightening the tops, and never leaving grey wood (*i.e.*, wood three years old). By cutting back the laterals to the base bud two good shoots were obtained, and the next year one of these was cut off. Crawfords should not be topped, as they bore on the end. He got eight or nine cases of big fruit to the tree, each tree having seven branches. He only thinned on weak trees. Elberta shoots could always be headed back, because they fruited in the centre. He believed in early pruning. It was a waste of sap to cut after the sap was rising. If the trees were cut early the sap would go into the spurs and they would get what Mr. Luffman used to call good bold fruit spurs. This system had given him good results, even on apricots. Mr. Young remarked that there were some peach varieties, such as Brigg's Red May, which it was quite a mistake to prune early. Mr. Olorenshaw headed his tops back to a lateral after two years, when the leading branches had become well furnished with spurs. He claimed to have less wood in his trees than anyone in Renmark. Mr. Young said that it would often pay to cut an old leader off and make a new leader out of a young inside shoot. In answer to questions, Mr. Young said the Keiffer's Hybrid was an awkward customer. The only thing to do with it was to thin the limbs out to bare poles, say to six leaders, which would bear fruit along their whole length. It was necessary to reduce the spurs a good deal; the clusters should be cut out to two or three spurs. Japanese plums and prunes needed very different treatment. Prune trees should be pruned for three years in the ordinary way, to shape the tree; after that they should be topped every year to a lateral. Spurs on the prune needed a good deal of thinning after they had fruited. Apples should be cut back for three or four years. Mr. Shields had seen pear trees in New Zealand forced into bearing by big spikes driven through the butts, and Mr. Young had seen good results follow girdling. Mr. Townsend was interested in root pruning in the "old country," and Mr. Young had seen Pennant Hill apricots, previously barren, brought into bearing by very severe root pruning.

ROSY PINE.

July 4th.—Present: 15 members.

ANNUAL MEETING.—The Hon. Secretary (Mr. A. Cameus) read the annual report, and the election of officers for the ensuing year followed.

MIXED FARMING.—In a short paper on this subject, Mr. Vaughan said farmers should not rely solely on wheat growing as the means of an income. Each settler should, if possible, have sheep on the land, as besides supplying the household with meat, their wool and lambs were a good source of revenue. Oats and barley should be grown in addition to wheat, as they made good grazing feed, and could also be harvested and fed to stock when feed was scarce. Cows, fowls, and pigs could also be kept profitably.

WILKAWATT (Average annual rainfall, 16in. to 17in.).

June 30th.—Present: 11 members and two visitors.

FARM OPERATIONS.—Mr. E. Altus, in a paper on this subject, took as an illustration, a farm comprising 1,000 acres, one which two able men could deal with; 250 acres of fallow should be sown with wheat, 250 acres with oats on the

ground that had been sown with wheat the previous season. The oat stubble could be left as feed for one year, and fallowed during the following year. In that way two men could make a good living, provided they had sufficient plant to work with. Twelve horses should be kept, which would allow one man to cultivate whilst the other was drilling. He thought 100 acres of oats should be cut for hay, and, provided no early wheats had been sown, they should have the hay carted by the time the crop was ready to reap. He favored a large harvester, one man being able to sew bags and do some of the carting, which would obviate all the bags standing out in the open should they have bad weather.

CARE OF HORSES' SHOULDERS.—In a short paper dealing with this question, Mr. H. Sumsion thought that one of the chief causes of that trouble was that the collars were not kept clean and well padded. The best cure for a sore shoulder was to wash the shoulders with clean cold water, and apply a little vaseline night and morning. When an ointment was put on the shoulders, it was a good plan to put a bran bag under the collar, because that kept the padding clean. Stockholm tar was also effective; it did not form hard scales. When boils appeared, a stocking filled with horsehair and placed either above or below, as the occasion required, would very often prevent it from spreading into a sore.—The election of officers then followed.

BOOKPURNONG EAST, June 2nd.—A paper was read by Mr. G. O. Adams on farm management. He thought it was advisable to have all paddocks lead to the stables if it were possible, and machinery should be overhauled after finishing, work and not before commencing.

July 7th.

A very interesting paper on "Horse Breeding on the Farm" was read by Mr. E. H. Schulze, and many points were discussed. Mr. Mayfield did not think it paid to breed horses in that district, as he had lost many mares and foals. Mr. Roberts was also of that opinion. Mr. Adams had found horse breeding very profitable. A. H. Schulze pointed out that horses bred on swampy land usually had very flat hoofs.

BRINKLEY, June 30th.—ANNUAL MEETING.—A discussion on the means of stimulating more interest in the meetings of the Bureau took place, and members were urged to be more regular in attendance. A programme for the ensuing six months was then drawn up.

COONALPYN, July 6th.—DEPTH OF FALLOWING.—Mr. R. F. Venning contributed a paper on this subject. He said fallowing should be commenced soon after seeding, and the land worked before harvest with the harrows, and again between harvest and seeding with a light cultivator. Land that had been broken up for two years he favored fallowing to a depth of 3in. to 4in., but land that had been worked for a longer period than that he would plough to a depth of 6in. He thought a four-furrow plough, worked with six horses, gave best results in that district, and that only by constant cultivation could one kill the weeds and keep the fallow in a good condition.

WOLOWA, June 28th.—MR. Smith (manager Veitch Experimental Farm) gave an account of the various wheats grown on the Experimental Farm. The speaker also gave his opinion as to the wheats best suited for that district. He recommended Yandilla King, Baroota Wonder, Walker's Wonder, and Gluyas. He said, although Federation had yielded the heaviest, he thought it more liable to disease than other varieties.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

July 16th.—Present: 14 members.

USEFUL BIRDS.—The Chairman (Mr. Edward Ashby, M.B.O.U., R.A.O.U.) delivered a lecture on "Useful Birds." He illustrated his remarks with about 100 skins of insectivorous and useful birds, explaining to the audience the habits and notes of the various species. It was pointed out that many birds that were looked upon as pests were, during the breeding season, great benefactors to the agricul-

turist and orchardist. He cited a writer from southern Victoria, H. B. Slaney, who said, "I am convinced that the starling is a most valuable bird to the agriculturist in southern Victoria. I saw none leave for its nest with less than three caterpillars in its mouth, and sometimes more than it could carry." Mr. Ashby mentioned that the little "yellow-rumped tit," which built yearly in the creepers in his front verandah, was one of the most useful of our small insectivorous birds. Last season the pair in question brought off three broods from the same nest, and during the feeding of the young, only a few moments elapsed between the departure of one parent and the arrival of the other with a beakful of insects. The number consumed during the breeding season alone must run into very high figures. Already those birds had a new nest well advanced, and would, if the weather were fine, soon be absorbed in the business of incubation. Another bird that was very common to the Blackwood district, the frontal tit shrike, was spoken of as being a splendid enemy to insect pests. With its strong beak it was able to remove rough pieces of bark and find the cocoons of moths, such as the codlin moth, beetles, &c., underneath. Mr. A. H. Mattingly, writing to the *Emu*, records having watched a pair of those birds devouring cotton scale on wattle trees, starting from the outer twiggs and working into the main stem. He estimated the work done daily by each bird as valued at 9d., and the approximate value of work done by each bird as equal to £14 per annum. He formed his estimate on the result of two days' observations. The great value of the "delicate" or "screech owl" (*Flammea delicatuda*) was shown by the examination of the pellets ejected by the owls. In 1914 Capt. S. A. White and Mr. J. W. Mellor presented to the S.A. Museum a large number of pellets ejected by that species of owl, and collected under the trees where the birds perched. Those were examined by Mr. Arthur M. Lea, the Government Entomologist, and the results were published in the *S.A. Ornithologist*, October 1st, 1915, by Capt. White. The pellets presented by Capt. White showed remains of 400 mice, 160 sparrows, 16 starlings, 10 musk parikeets, five other small birds, 15 young rabbits, one bat, 48 frogs. The period over which the pellets were obtained was six months, but as the owl roosted on other trees as well it was estimated that fully double the number were ejected during the six months, or four times the number during the whole 12 months. Thus Capt. White estimated that the single bird would destroy in one year—Sparrows, 640; starlings, 64; mice, 1,600; young rabbits, 60. In addition to the contents before referred to, the pellets contained remains of 20 different species of insects, very largely beetles. It was evident the delicate owl was one of the most useful friends to the agriculturist. Waterton, speaking of the English form of the same species of owl, said:—"When it has young it will bring a mouse to the nest every 12 to 15 minutes. But in order to have a proper idea of the enormous quantity of mice which this bird destroys we must examine the pellets which it ejects from its stomach. Every pellet contains from four to seven skeletons of mice. In 16 months from the time that the apartment of the owl on the old gateway was cleaned out there has been a deposit of above a bushel of pellets." One of the most valuable of the native birds in the orchards around Blackwood was the white-browed babbler, sometimes called the twelve apostles, because they went about in companies of about a dozen. Mr. Ashby said that those birds were almost daily working in his garden turning over the leaves and debris under bushes and trees searching for insects. Mr. Chisholm, of Maryborough, Victoria, in the *Emu* of July, 1908, referring to the Victorian species of babbler, said—"As a practical illustration of its value I may mention a case that came under my notice recently. A grub, light green in color, and varying in size from half an inch to an inch and a half long (probably the lava of the agrotis moth) was attacking my rhubarb plants in great numbers, and bade fair to ruin the whole of the plants, when my friends the babblers took part. The grubs did not come out during the day, but hid in the soft earth, at the foot of the plant, only coming out to feed when night fell. The fact did not deter the babblers in the slightest degree. As soon as they located the grubs the birds arrived in dozens, and all day long were to be seen digging and pecking with great vigor all around the plants. In a very short time, where formerly there were hundreds there was not a single grub pest left." Mr. Ashby urged his hearers to provide suitable nesting sites for the useful feathered friends. It was in his opinion a great mistake to clear out all the scrub, especially underscrub from the neighborhood of orchards. Small blocks of native scrub and kangaroo furze bushes (*Acacia armata*) should be preserved and protected as far as possible.

CLARENDON (Average annual rainfall, 33.67in.).

July 2nd.—Present: 17 members and three visitors.

ANNUAL MEETING.—The Hon. Secretary (Mr. T. B. Brooks) read the annual report, which was followed by the election of officers for the coming year. Mr. H. Morphett then gave an address on "Draining Land." He said he had planted an apple orchard 15 years ago, and had found that too much water lying on the bottom caused the roots to rot. As a remedy he had cut a drain about 3ft. deep, and laid stones on the bottom and sides. The drain ran a good stream of water all the winter, and the soil was kept in a fertile condition. He considered a great deal of the land in the hills district required draining. Mr. J. Potter said his method for draining land was to take out a drain 18in. wide, 2ft. deep, then go 12in. depeer by 8in. wide, fill with small stones, and cover with large flat stones and fill with the soil taken out. Mr. J. Spencer was strongly in favor of draining soil, and his experience was that it brought land from a useless state to one of fertility. Drains put down over 60 years ago by his father on his homestead with a top stone over the stone sideways, as recommended by Mr. Morphett, and then covered with teatree before filling were still running well.

KANMANTOO (Average annual rainfall, 17.90in.).

June 30th.—Present: seven members.

TIDINESS ON THE FARM.—In a paper on this subject, Mr. R. S. Talbot said a farmer should have for a motto, "A place for everything and everything in its place." On many farms one could not help noticing the number of tools, harness, and implements that were left either standing in the paddocks or lying about the stables, sheds, &c. Much time was lost through one having to look all over the place for some small tool or other which could quite easily have been put in its proper place after the last time of using. Such implements as the binder, winnower, drill, strippers, &c. should have a shed with a wire netting door to keep out the fowls, otherwise those birds made the machinery very dirty. Pieces of barb wire, old tins, iron, &c. if kept out of harm's way would save many an injury to the stock of the farm. Attention should be given to the fences and gates. Those gave the farm a very untidy appearance if neglected, and with a little care could easily be kept in good repair. Discussion followed.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

June 30th.—Present: 12 members and one visitor.

HOMESTEAD MEETING.—The meeting was held at Mr. E. Colley's residence, and an interesting time was spent in inspecting the orchard and garden. A discussion was held on the scheme of starting returned soldiers poultry farming. Figures given at that Branch showed that 950 to 1,000 chickens hatched gave about 500 pullets, at a cost of 3s. per head up to the age of six months, and they had to be kept seven months before any return could be realized. That suggested that one would probably have to carry on for two and a half to three years before getting into good working order. Two actual experiments were recorded. A member of the Branch had put a batch of eggs in the incubator, and the chicks hatched on August 1st, 1913. From them 25 of the best strain White Leghorn pullets were set apart, and they began to lay at five months old. A record was kept until the first real moult, March, 1915 (16 months), during which time the hens had laid 5,678 eggs, or an average of 227 per hen, which had worked out at equal to a return of £1 0s. 5d. per hen. The cost of food for that period was 10s. 6d. per hen. Forty-five pullets hatched on April 1st, 1914, began laying at five months, and until they went into moult they laid on an average 93.5 eggs per hen, representing 6s. 5d. per bird, which did not cover the cost of feeding. Members made emphatic reference to the necessity for a reconstruction of marketing methods in South Australia.

MEADOWS SOUTH (Average annual rainfall, 35.52in.).

July 4th.—Present: 11 members.

CLEARING ROUGH AND TIMBERED COUNTRY.—In a paper on this subject, Mr. H. Champion said the clearing of land such as surrounded that district was one that should be of interest to every member, whether he was farmer, grazier, or

wattlegrower.. The land in its natural state was practically useless, the sourness of the grass prevented stock from feeding to any great extent, and it was almost impossible to attempt to cultivate any kind of crop. Clearing could be divided into two classes, one for cultivation of crops, the other to grazing or growing wattles. In felling a tree one should open it on the leaning side, care being taken to cut all the front roots first, as if that were not attended to, it would cause trouble in grubbing the tree. He recommended the use of gelignite for blasting stumps, as that was a cheap and effective way of getting them out of the ground, and also had the advantage of shattering them very considerably. The cost of clearing that class of land was anything from £2 to £7 per acre, and that could only be reduced to a minimum by one having good appliances and labor. To clear for grazing or wattle cultivation was a much easier operation. Stringybark, red and white gum could be ringbarked at an average price of about 6s. per acre; 2ft. 6in. above the ground was about the right height to ring the tree. Shoots or aftergrowth should be knocked off; once each year for three successive years would kill out most of them. Mountain and blue gum were much more difficult to handle. He found the most effective way in dealing with that class of trees was to bore a hole well into the butt at ground level and again revert to the use of gelignite. After many years' experience of forest work he had come to the conclusion that it was a waste of time to attempt to start clearing until one's mind was made up to consistently and in a business-like manner see the job through, as a paddock, rung out and then left, would in a few years become worse than it was in its natural state.

MORPHETT VALE (Average annual rainfall, 23.32in.).

July 7th.—Present: seven members and two visitors.

CLOSER SETTLEMENT.—In a paper dealing with this subject, the Hon. Secretary (Mr. A. F. Furniss) said though hay, grain, and grapes for wine and currants would probably always be the chief products of the district from Reynella to Willunga, there were others that could be called side lines deserving of more attention than they received at present. It was well to have one's eggs in more than one basket, and fairly divided among the baskets. Grapegrowers would be apt to think so after the experience of the last three years, especially with prohibition a possibility. Dairying, with pig-raising, was a proposition that should be profitable in most parts of that district. Not haphazard dairying, depending almost entirely on natural grasses, but all the year round dairying, to ensure which fodders must be grown. To grow them a good supply of water was, of course, essential, and they had every reason to believe, from bores and wells in the district, that such supply could be readily obtained at a reasonable depth. In pointing out what fodders to grow, he thought maize was one of the best, and there were various millets, and root crops such as mangels and swedes. Lucerne was good, but was said to be subject to flea; but he thought it had not been grown to any extent. It was surprising what even an acre would turn out with plenty of water and manure. The grass, hay, and fodder grown on 25 acres, of which, say, two were under irrigation, should be ample to keep half a dozen cows and a score of pigs, and the profit from these should keep an ordinary household going. The greater the area under irrigation the less was the total area required, as one acre irrigated was equal to many under natural conditions. Drought had no terrors for the irrigationist; in fact, he generally did better then. A few acres of vineyard, say, 10, well worked and manured, should turn out a fair profit, and a half-acre of orchard and vegetable garden be ample for home use. Fowls, as a matter of course, were kept on every farm; but he did not look to them for too much profit. With that variety of products, he thought a settler should do very well on 80 acres, as he would have nearly 50 acres left on which to grow hay, grain, or peas. No doubt such an area seems absurdly small to people used to hundreds of acres; but water made all the difference, and many people who had a supply made a living on a quarter of that area, and had waste land even in that. There was little waste or useless land in that district. Another point was that a man holding, say, 320 acres, worth £10 per acre, was employing a capital of £3,200, and required a plant with many hundreds of pounds more. The interest and depreciation in that would amount to more than £200 per annum, which had to be allowed for before any real profit could be shown. He did not think it was too easy to make a reasonable profit in haygrowing above that amount, when half the land was

practically idle for a year. With an average of six settlers per square mile, instead of two or less, they should have better roads, more social facilities, more traffic for the railway, and more trains. With a regular and abundant supply of milk assured, it was probable that the milk purveyors of the city would be only too glad to get some of their supplies from that district. In view of the advantage to the railway that would accrue from a closer settlement of the land, he suggested asking the Government to test the district with bores for an artesian supply, as the land was undoubtedly fertile enough to justify the expenditure, and the prospect of obtaining the water good.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

May 31st.—Present: nine members and one visitor.

REMARKABLE PINES IN THE SOUTH-EAST.—Mr. A. Dow contributed a paper under the title "Forest Conservation." "The *Pinus insignis*, or Remarkable pine, may be described as a quick grower, ornamental, useful for shade and shelter, and eventually a profitable one for market," he said. "From observation I would say Glencoe scrub land has a soil and climate suitable for producing this class of timber. The best specimens I have noticed lately are those at the foot of the range and in the scrub, and this makes me inclined to think that scrub land would be very suitable for growing Remarkable pines." If so, scrub land could be made more valuable than at present, for these trees are the quickest growing trees I know of, and, although of rapid growth, the wood is sound and good. But as the 'prophet is not without honor, save in his own country,' so these beautiful pines are not appreciated in the place of their growth. This is very evident by the fact that our pine timber is often made into fruit cases, &c. At the same time we import timber from long distances, often inferior timber, too, for making into higher class goods. Why are our pines not more used for home productions? If we could get our own grown timber on our local markets it would be a payable proposition for the Government to plant forests of pines, red gums, and stringybark. These plantations would not need much attention, as they would have to be reserved until grown enough to meet requirements for higher class wood work, as furniture, pianos, etc. These pines are easily grown from seeds. The seeds are easily gathered if the cones are picked about Christmas time and laid in the sun. The cones open, and the seeds easily come out. If sown in spring they should grow well when started. Some advocate utilising some part of our three-chain roads in timber-growing, but this has disadvantages as well as advantages. For producing timber trees need to be grown as a forest about 6ft. apart. They do not do well in a wet or sour soil, but that want of water affects them is proved by some around here that began to die at the top in the drought, but after the rains came they recovered. The practical side of the question, viz., producing pines for profit, is not often approached. Most of our local pines are for ornament or shelter, but some day the cultivation of pines for profit will be one of our great industries in the South-East." Mr. M. D. Cameron said that when pines were planted about the homestead care should be taken that they were at a sufficient distance from the garden and house, or the roots would rob the garden of its fertility, while the needles caused trouble in the guttering. He was of opinion that a large area of land around Glencoe now deemed almost useless, could be profitably planted with pines, and in 15 years they would be ready for the sawmill. He did not advocate the planting of red gums, as they required a good soil that would ordinarily grow good pasture. Pines and stringy bark, however, would thrive on poor soil, and required little attention, except protection from fire. Mr. F. A. Telfer did not favor planting pines, as the timber was useless for outside work, and he did not think there would be much demand for the boxes and cases that might be made from the timber. Mr. John Riddoch believed that it would be more profitable to utilise the scrub lands for growing timber rather than attempting to grow grass on it. Mr. J. Dow said natural timbers such as stringybark and red gum were better than pines. Stringybark was a quick grower, and a good wood for furniture as well as for posts. Red gum did not need planting on land that had carried gums previously, for if the ground were protected from stock thousands of seeds would start into growth, and they would only require thinning and attention for a few years. Mr. H. A. Cameron said that years

ago he had the work of setting out a plantation of pines, and had to dig holes 2ft. 6in. square by 2ft. deep. The work had been heavy, but 90 per cent. of the pines grew, and were a fine grove to-day. He knew of pine trees that had been sold up to £15 each. Red gum was a splendid timber, but the growth was slow. Mr. J. T. Halliday said that digging holes and planting trees in them was not good; all the land needed was working to a fair depth. Seedlings would make better trees than those transplanted. He considered stringybark was a faster grower than the pine, and the timber was highly esteemed in the furniture trade. He would plant pines at 10ft. apart each way, that would be 400 trees to the acre, and they would grow straight. The trunks were needed for sawing, not limbs, therefore the trees should be shaped and pruned. At the instance of the Secretary it was decided to ask the Railways Commissioner for permission to plant a row of ornamental and shade trees in the station yard at Glencoe.

KONGORONG.

July 3rd.—Present: 14 members and five visitors.

PLANTING FRUIT TREES.—In a paper on this subject, the Orchard Inspector for the South-East (Mr. R. Fowler) said before planting an orchard or farm garden, the first thing to consider was the selection of a suitable site. The commercial orchardist could generally select that which would best suit his particular purpose, as planting a large orchard was a fairly expensive operation, and generally not undertaken without due consideration; but it was very often different with the farm garden. Usually the farm house and outbuildings were put up without any thought about a garden; the site was selected for other considerations than that of a garden. When the garden was thought of, it had to be placed in the most suitable position available, on whatever class of soil the farmer happened to be located on; but if there were any choice of site, a piece of gently sloping ground, with a north-eastern aspect, was the best. The top and the very low lying portions subject to frost should be avoided, and the trees should be planted with the rows running north and south, if possible. Having given attention to the position of the garden, the next consideration was the soil; that, again, of course, was often a matter of chance. Whatever was available had to be used, and though by far the larger portion of the soil in South Australia was either naturally suitable for the growth of fruit trees, or could be made so at little expense, the best that was available should be chosen if there was any choice. Fruit trees would succeed in a great variety of soils, but they appeared to like a deep friable loam or a black sandy soil, provided there was a good substratum or subsoil of clay; but they would also thrive in volcanic soil, and even in limestone country, provided there was a fair depth of overlying soil; but they did not like heavy clay or very cold soils, unless they could be well drained, which was also necessary in almost any soil. Shelter was a matter for serious consideration, more especially in that district, where there was very little natural cover available, and where one was subject to sea breezes, which were especially harmful to fruit trees. One needed artificial breakwinds, and these should be planted some years ahead of the fruit trees, as it usually took a few years for a hedge or plantation to develop. He was not conversant enough with that district to venture to suggest the best trees to plant, but something that would thrive and grow quickly would be the best. If plenty of land was available outside the garden, he thought *Pinus insignis* and sugar gums would make a good break, or *Cupressus Lambertiana horizontalis*, or Cypress hedge, was good; but whatever was chosen must be dense enough to break the wind, though not necessarily close enough to shut it out altogether, for often that was a worse condition than no break at all. The breakwind should be at least a chain or more from the nearest row of fruit trees, and if it were impracticable to raise a plantation, then the outer rows of trees should consist of some hardy variety, such as almonds, cherry plums, or figs. Those might be planted fairly close together, and were often a source of profit as well as shelter. In preparing the soil, the only real chance one had was before planting, and the more thoroughly that was attended to the greater would be the subsequent success of the garden. After the planting, it was not practicable to do more than ordi-

nary cultivation. If it was virgin land, it should be thoroughly cleared of all trees, stumps, roots, and stones, and the whole surface should be broken up to a depth of 6in. to 9in., and the mouldboard plough should be followed by a subsoiler, breaking the subsoil another 6in. or so. If that could not be done, the ground should be trenched by hand, care being taken not to bring the subsoil to the surface. That was also the time to consider proper drainage, as there were few soils that would not benefit by it, and he was sure the soil would be all the better for it, as they had an abundant rainfall. The subject of drainage was a large one, but he would just like to point out that drainage not only kept the land free from surplus water, but also helped to retain the moisture during hot weather. Drained soil was rendered cooler in summer and warmer in winter, and the roots of trees and plants could penetrate deeper and derive more nourishment. If the land was new and sour, it would be better to put off planting for a year, and improve the condition of the soil by cultivation or by growing some other crop, such as hay or peas. Having cleared and ploughed the land, and securely fenced it, which fence should be rabbit proof, the next step was to mark out where the trees were to be planted; good short stakes should be provided for that purpose. Nothing looked worse than a badly planted orchard. A little time and thought given to the laying out of a garden was well worth while. The distance between the trees would depend on circumstances to some extent. It was usual, in ordinary soils, to plant 20ft. apart; but in a garden 16ft. would be about the limit. When trees were not allowed sufficient space of growth and development, they would never thrive; the roots competed with one another to occupy all the soil, the branches met and excluded light and air, and then all sorts of noxious insects and fungi made their appearance, and unless the trees were cut back hard the insects could not be successfully dealt with. Sixteen feet might seem at first a long way apart, but one would find it was not so when the trees grew up. If it was the intention to cultivate the garden with horse implements, one must allow headlands at least 20ft. wide for working, and after having marked that off, start from a right angle corner with a line marked off in 16ft. or 20ft. spaces; put a row of pegs down on either side, and stretch the line across between the two sets of pegs, taking care to mark off the places. If that were properly done, the pegs should be in line on both angles, as well as straight up and down and across. Having pegged out the ground, holes should now be dug about 4ft. square, with the centre of the hole where the tree would be placed. It was not recommended to dig deep holes. A good plan was to dig down about the depth of the spade, removing the soil; then loosen the subsoil to the depth of the spade, but not removing it, and if a supply of well-rotted stable manure was available, mix four or five good shovelsful with the subsoil, and a little bonedust or basic slag could be added. The holes could then be almost filled in again and the tree planted. Considerable care should be taken in planting the trees. First of all, broken roots should be cut back to healthy tissue, and all shrivelled fibrous roots be cut off as well, and the tree should not be planted any deeper than it stood in the nursery. That would generally be indicated by the soil marks and discolored bark. The roots should be spread well round, and with a downward tendency, the tree being planted on a small mound of earth close to the stake. It very often happened with nursery stock, grown close together in rows in the nursery, that the roots had a tendency to grow stronger across the rows than along them, and where the tree was provided with only one or two strong roots, it was well to place one in the direction from which the prevailing winds came, to brace it up, otherwise there was a danger of the tree being blown over later in life, when it would be a difficult matter to replace it. The soil should be firmly trodden down between and upon the roots at planting time, and it was perhaps better to leave the pruning for a few weeks. The young tree should be secured to the stake, so that it would not be blown about when growth commenced, to the injury of the young roots; but attention should be given to the ties from time to time, because they were apt to cut into the trees. The same thing applied to writing the name on a label and attaching it to the tree. The string or wire was very often left until it cut its way right into the limb or trunk, sometimes resulting in serious injury to the tree. It was better to make a rough plan of the garden, each tree being shown by a small circle, with its name opposite. The best time to plant deciduous trees was in May or June, though planting could be done as late as August. If planted early, while the

soil retained some warmth and had had a good soaking rain, trees would have a considerable start over those planted later in the year. Citrus trees did best when planted out in early spring; the young growth was not then liable to be cut back by frost, as was the case when planted in autumn. For the farm garden a wider range of varieties was available, but the main thing to keep in mind was to have a good succession of fruit, and at the same time the best for eating and preserving purposes, as the main object of a garden was to provide a healthy and necessary addition to the daily menu. For commercial purposes, consideration should be given to the markets available. The grower of fruit for the local market planted sorts that had proved a success in that district, and varieties that would come in when prices were good; while for the grower on a large scale, his efforts were generally limited to export varieties and those fruits that could profitably be dried. In planting a large orchard, consideration should be given to cross fertilisation by planting varieties that flowered at the same time in close proximity to each other; that was also a large question not within the scope of this paper. Pruning was an operation often neglected by amateurs; more often than not the trees were planted just as they were received from the nursery. Time debarred him from going into all the reasons for pruning a young tree at planting, but it was a practice universally adopted by all orchardists and was based on sound reasons. The practice was to cut back to three or four main arms, taking care that they did not all radiate from the same centre, but, if possible, at regular intervals, the reason for that being that there was not the same liability to split in after years. The cuts should be clean and to an outward bud, and sloping from the bud upwards and in such a position that the subsequent growth would give a regular formation. The stronger the shoot, the longer it should be left in comparison with its weaker brother; but if possible the topmost buds of the pruned limb should be as nearly as possible on the same plane. If the cut were too close to the bud, there was danger of the young growth breaking away and destroying the shape of the tree. With upright growers, like Rome Beauty and Tasma, the cut was made one inch or so above the bud, which had the effect of making the shoot grow more obliquely to the stem. It was also a good plan to tie straw round the stems of young trees to protect them from hares and rabbits, and also from the direct rays of the sun until protected by some of their own foliage. When the garden comprises half an acre or more, he recommended the following proportionate numbers of the different kinds of orchard fruits as suitable for the average family, and when planting it was well to provide enough, though a small garden well looked after was better than a larger one neglected:—Twelve apples, six pears, six plums, four cherries, four peaches, four apricots, two figs, one mulberry, two almonds, one quince. The following was a list of suggested varieties to choose from:—Apples for export—Cleopatra, Jonathon, Dunn's Favorite and Rome Beauty; and for the small garden, Gravenstein, Irish Peach, Jonathan, Dunn's Favorite, Rome Beauty, Cleopatra, Nickajack, and Rokewood. Pears for export—Glou Morceau, Burre Bose, Josephine, and Winter Nelis; for small gardens, Duchess, Packham's Triumph, and Vicar of Winkfield. Peaches—Triumph, Briggs's Red May, Early Crawford, Royal George, Salway. Nectarines—Goldmine and Stanwick. Apricots—Oullin's Early and Moorpark. Plums—Angelina Burdett (black), Early Orleans (red or purple), Coe's Golden Drop (yellow), and Green Gage (green), also Japanese plums, Burbank and Wickson. Cherries—Early Lyons (black), Biggareau Napoleon (amber), and St. Margueret (purple). Figs—White Genoa and White Adriatic. Almonds—Hatche's Nonpareil and Peerless. Quinces—Champion and Pineapple. Grape vines—Black Hamburg, Wortley Hall, Red Prince, Red Malaga, Crystal, Early Green, Doradilla, Muscat, Gordo Blanco, Waltham Cross. Before the arrival of dry weather the soil should be well worked up round each tree and over the whole surface, if possible, and a mulch of stable litter put round each tree, extending at least a yard beyond the points of the young roots, to prevent evaporation of moisture from the soil, and to ward off extreme heat. While young, the mulch might be placed fairly near the tree, but as it grew older it should be spread out farther. All care and attention were generally given to young trees the first year, but very often they were sadly neglected later on. That should not be; they required the same careful attention every year, like any young animal, if they were to succeed. It was unwise to make a practice of turning the garden into a calf run, as they would very soon ruin it.

MUNDALLA.

July 11th.—Present: 11 members.

CARE OF FARM MACHINERY.—In a paper dealing with this subject Mr. G. H. Saxon said that as machinery was one of the most expensive items on the farm great care should be taken that the implements were kept under cover when not in use. Before a machine was taken out of the shed to commence work it should be thoroughly overhauled—nuts tightened and all oil holes and cups cleaned out. Should a bearing be noticed that was nearly worn out it should not be left until the part broke. That would often cause waste of valuable time in the busy season. When finished working the machine a good point was to see that all tension springs were relaxed. A block of wood placed under the off side corner of the harvester comb would take the weight of the machine and prevent sagging. It was well to take off the belt of the harvester, oil, and put it away. The canvas of the binder should also be looked after, and above all, none of the farm machinery should be used for fowl roosts or gates.

NARACOORTE (Average annual rainfall, 22.60in.).

May 12th.—Present: 30 members.

VEGETABLE CULTURE.—This subject was introduced in a paper by Mr. Hutchinson. Where it was proposed to grow asparagus, he suggested the selection of a piece of sandy loam, and in that mark out a trench 2ft. 6in. wide and from 20in. to 24in. deep. If the bottom of the trench were clay, it should be loosened to a depth of 6in. On that should be placed successive layers of garden refuse (such as pea straw, old tomato vines, or bean straw), old dry grass, then about 6in. of stable manure, and then 6in. of the soil removed from the trench. Asparagus crowns should be placed at intervals of 2ft. along the centre of the trench, a little mound being made under each crown, and the roots spread around. The surplus soil should then be placed in the trench. When that had settled down the crowns should be 5in. or 6in. under the surface. The best time to plant was about the middle of July; and after the bed had settled down, a good top dressing of well-rotted stable manure should be applied. He preferred crowns two or three years old, and the first year after planting he would not cut any grass. The second year only the very strongest should be taken, but not too many; but the third year, provided only the long stems or grass were cut, as much as was needed could be cut. "If all the grass were cut as it came up, the plants would die out in a couple of years," the paper continued. "During April, while the berries are red, but not falling, cut all the grass down, and clear off somewhere handy to go into next year's trench. During July give a top dressing of bone super. or blood manure at the rate of 1lb. to 10 sq. yds., then give a good top dressing the same as done 12 months previously. As soon as spring approaches the grass will make its appearance, and when it is about 3in. through the soil it may be cut off about 2in. or 3in. below the surface. Although asparagus cannot stand a soil which is not well drained, it likes a liberal supply of water during hot weather. Conover's Colossal and Palmetto are the varieties I advise planting. French Bean.—This vegetable is well known to all of us, and I think almost everyone at one time or another has grown it. Being a hot weather plant, the seed should not be planted till all danger of a frost is past. French beans are divided into two classes, viz., the tall growing or climbing, and the dwarf. I prefer the latter, as it is less trouble to grow, not requiring poles or wires to climb on, and the quality is quite as good as the tall variety. The most suitable soil is a good sandy loam, with a well-drained bottom. Sow the seeds in rows 2ft. 6in. apart, and the seeds about 6in. apart, and about 1½in. deep. The butter bean is a French bean, but is of a different growth, the leaves being a lighter green, and instead of the pods of beans being green, some varieties are quite a butter or yellow color, others a lighter shade, and some quite white. All are stringless, this being a great advantage, as they will, after coming to maturity, stand some days longer than the French bean and then not be tough. The French bean standing the same time would be quite unfit for use. Butter beans are of two classes, viz., tall and dwarf. The culture is the same as for French beans. Both French and butter beans should be planted monthly for a succession of crops, the last being sown about the second week in January. Cabbage and Cauliflower.—I have taken these two together, as their culture is the same. There is a great variation amongst cultivated types, particularly in the

leaves. The outer leaves may be large or small, few or many, flat or curved, curved inward or curved outward, inclosing the head closely or loosely. The heads may be large or small, flat, flattened, globular, elongated, pointed acutely or obtusely. The cabbage is, I think, one of the most popular vegetables in cultivation, and no garden should be without it when the season allows it to be grown. It is a most gross feeder, and it is almost impossible to overfeed it with good farm manure. Of course, artificial manures have to be used with more care. Stable manure has given me the best results, but this being unobtainable, the next best is bonedust. As much as half a ton to the acre is given where growing on a large scale. The cabbage must be grown rapidly. This cannot he done without a good supply of food. For an early, heavy, compact-growing variety I recommend Champion Early All Head. It has scarcely any outer leaves, and takes up very little space. Early York is another good variety. Second, Early East Ham, Enfield Market Succession, London Market. The most destructive pest is the cabbage caterpillar. It is extremely hard to deal with. By syringing with nicotine, pine spray, or fir tree oil it may be greatly reduced. The cauliflower requires the same treatment as the cabbage, but the climate is one of the most important points in its successful cultivation. In a cool climate it can be grown for about nine months in the year, whereas in the hotter parts its cultivation is limited to about six months. Like the cabbage, the cauliflower's greatest enemy is the cabbage caterpillar. Carrot.—The most suitable soil for this is of a very sandy nature. In such soil the roots are well shaped; in bard, heavy soils it is impossible to grow a crop of well-shaped roots. New manure should not be given to them unless placed at a good depth below, as if put near the surface it will cause many roots to fork. Various planting distances are used by different growers, about 12in. to 14in. between the rows for working hand hoes, and, if for working horse hoes, 24in. to 30in. The distance apart for the roots should be about 4in. Carrot seed being very small, it requires a very light covering. Germination takes from 14 to 21 days, according to moisture and warmth. For general crops about the first week in August is the most suitable time. Thinning should be done before the plants get too large. Cucumbers are a summer vegetable, and should not be put in the open till all danger of frost is past; but early ones may be grown in frames. They may in this way be had by November. The most suitable soil is a light one and very rich, a good plan being to make holes 3ft. across by 1ft. deep, and then filling up with soil mixed with plenty of well-rotted manure. They must be grown quickly, and during the summer get plenty of water. Liquid manure may be occasionally applied with good results. The best varieties are Long Green, Giant Pera, and Burpee's Famous, and for pickling, gerkins and short prickly. Lettuce is by far the most used and popular salad crop grown. To produce good firm, crisp, and sweet heads they must be grown very rapidly, and therefore require well enriched soil, and one that is of a sandy nature, and during warm weather large supplies of water are needed; but at the same time, it must be well drained, this being an important point. It is a cold weather plant, and stands cold better than heat. For late crops it is better to sow the seeds in rows, and thin out to the required distance apart. Transplanting in dry weather is a risky thing, to say nothing of the check the plants get. There are two sections of lettuce, the cabbage and cos. The latter is seldom grown, being less tender than the cabbage lettuce. The best cabbage varieties are New York, Neapolitan, and Iceburg. The water melon is a native of Africa. Although popular for dessert in many parts of the world, it has met with greatest favor in America. The water melon thrives best in a warm climate—one with day and night temperatures high. A sandy soil is suitable for water melons, but requires a well drained subsoil. The soil should be well supplied with humus, although an excessive amount may cause too much vine growth, thereby lessening the crop. The best varieties are Coles' Early, Halber Honey, Cuban Queen, Santiago, and Sugarstick. A deep, fertile sandy loam, with a well-drained clay subsoil, is undoubtedly the most suitable for the tomato, but it can be, and is, grown on a great variety of soils. Most growers on a large scale do not train or trellis the plants. It is undoubtedly an advantage, as it keeps the fruit off the ground, thus lessening the chances of destruction by different kinds of insects. The fruit is also cleaner, but the high cost of labor prohibits training, and the plants are allowed to lie on the ground. Pruning is a very great advantage for the private grower; the fruit matures quicker, has better shape, and is altogether better. Here, again, the cost of labor prevents the large grower pruning. Tomatoes grown under glass may be had on the market by about

the end of October, but the general crops in a favorable season do not come in till about the first week in Jannary. Each year the tomato bed should be changed. When grown on new ground it is nearly always a success. No vegetable deteriorates more or becomes more liable to disease when grown for more than one year on the same ground. Good varieties are Hnnt'a Dwarf Perfection, Wilding's Prolific, Australian Large Red, Magnum Bonum. The onion will succeed in any ordinary garden soil that is well worked, the surface kept nice and loose to allow the bulbs to expand, also to retain as much moisture as possible. I look on the onion as one of the easiest and hardiest vegetables grown. When once properly established, and it has had some nice spring rain, it does not require any further waterings. For the small grower the most convenient way for cultivating is to sow tho seed in seed beds about May, and when large enough transplant into beds. Half an ounce of seed will be quite sufficient for the ordinary householder. This equals 3,500 seeds. In a pound of seed there are 112,000 seeds. It has been proved beyond a doubt that onions grown on rather a heavy soil have better keeping qualities than those grown on lighter soils. Onions should not be stored till thoroughly cured. Soft and miniature bulbs should be sold as soon as gathered. A nice bright appearance is of importance when selling; therefore the bulbs should not be exposed more than necessary. When transplanting onion plants it is a good plan to trim the tops and roots severely. By so doing they stand the transplanting better. Other kinds of onions are the potato and tree. The former is so called on account of the bulbs forming in a cluster round the set. They are very prolific, and as many as 12, and even more, are formed from one set. The tree onion forms numerous small bulbs on top of long stems, and are used as picklers. The set also grows, and can be used like the ordinary onion. Silver-skinned onions are sown thickly, and are used for pickling, they being more sought after for that purpose than the dark-skinned varieties. Special onion manure is sold by ths different firms, and it gives good results; but when obtainable, farmyard manure is the best. Some good varieties to grow are Brown Spanish (an old and very popular kind, and hard to beat), Brown Globe (much after the style of the last named, but the bulbs are more globular), and the Extra Early Goldon Globe. The latter is an onion which is not grown enough, and should be better known, it being much earlier than the two former onions, is a splendid shape, bright color, and is a most desirable one to grow. All these I have mentioned are excellent keepers. The parsnip is a very important root crop, and one that should be in every kitchen garden. It prefers a deep rich soil—that which is rather heavier than a sandy loam. It is closely allied to the carrot and celery. The seed for the general crop should be sown about the first week in August, the rows being about 18in. apart, and when thinned the plants should stand about 5in. apart. The seeds should be sown no thicker than carrot, as the seed does not ripen all together, and many seeds sown do not germinate. This takes about 18 or 21 days. No manure should be used unless dug in very deeply, as if too close to the surface it will cause the roots to fork and branch.'' Mr. W. H. Smith inquired the cause of the black smutty development frequently to be seen on tomatoes, and what he would recommend as a preventive. Mr. Hutchison thought trellising might tend to prevent it, as it was caused by dampness, and the plant would be away from the dampness of the ground. Pruning was also good, as it allowed the sun and air to get through the plants. The Rev. F. W. Brasher said he had seen tree or potato onions growing in his garden, and one had a cluster of small onions on top. He would liks to know if that was usual with such onions, and were the small ones of any use. Mr. Hutchison said the potato onion sent up a stem with a cluster of small ones. Mr. A. Johnstone said both the tree and potato onions sent up small ones, and they were the true seed, and could bo nsed. Mr. Holmes inquired if there was apy ground for the impression that transplanted lettuces went to seed quicker than those which were reared direct from the seed. Mr. Hutchison said that lettuces sown in drills and thinned out did not go to seed so quickly. Mr. A. Johnstone said if they took off the tap root in transplanting they would not go to seed so fast. The Chairman would like to know what to grow after tomatoes and pumpkins. Mr. Hutchison said he seldom grew the same vegetable on the same ground the second year. A rotation was necessary to restore the ingredients taken out of the soil. He preferred a crop of peas to be put in. He would not advise planting the same vegetables in the same plot until the third or fourth year. Mr. A. Johnstone said the disease on tomatoes referred to by Mr. Smith was caused by too much humidity.

It was really the same disease that attacked the potato plant, known as Irish blight. In reply to a question, Mr. Hutchison said that he had used the special manures for vegetables, but stable manure was the best to use. Mr. A. Johnstone said that organic manures were always used for vegetables, and not mineral manures. In reply to a question, Mr. Hutchison said it would be difficult to lay down a system of rotation in growing vegetables. Circumstances and the character of the land had to be taken into account. He would say never grow the same plant twice in succession on the same soil. He thought there should be an interval of three years, during which they could put peas in as a rotation. He would follow cabbages with a crop of French beans, and he might put in turnips. Mr. Donoghue said he had been growing the same kind of vegetables in the same ground for a number of years, and always had good results and good quality. He had shifted his tomatoes over to get nearer the water tap, and they had been grown on the same spot for three years with good results. He dug up the land well and put lime on it and used manure.

POMPOOTA.

June 27th.—Present: 40 members and one visitor.

SUCCESSFUL FARMING ON A SMALL HOLDING.—A paper on this subject, written by Mr. A. Clark, was read by the Hon. Secretary (Mr. H. H. Orchard). The paper dealt with the Monteith area from its allotment, eight years ago, and the pioneering experiences of those settlers were closely followed by members. Following the reading, an interesting and general discussion took place, Mr. Clark being called upon to answer numerous questions.

POMPOOTA.

July 11th.—Present: 47 members and two visitors.

SWINE BREEDING AND REARING.—"It is of great advantage when starting to breed any class of stock to have a knowledge of their early ancestry, so that we may be able to detect at once any offspring that shows the least tendency to revert to the original wild types," premised Mr. F. C. Grace, in a paper dealing with breeding and raising of pigs. "This selection is particularly necessary with swine, as they revert very quickly under injudicious mating. The present-day domestic swine, naturalists are generally agreed, have all sprung from two breeds of wild animals. The wild hog of Europe, Western Asia, and Africa, and the Chinese hog of Japan and Eastern Asia. The European animal was a rough, savage brute, long snouted, long legged, with massive head and shoulders, a mass of muscles and bristles, but hindquarters very deficient. The gamest of fighters, and always ready for trouble; sandy or black in color, and lived chiefly on roots and herbs, though nothing came amiss to his capacious maw. The Chinese hog, on the contrary, was a robust block animal, mostly white and black. The domesticated stock were remarkable for their fecundity and rapid growth. The head was short, ears small and upright, body low to the ground, legs short, and hair thin. A selection of the wild European hog that was largely used in the improvement of swine generally known as the Neapolitan, was a blueish almost hairless pig, not so fecund as the Chinese hog, but much on the same pattern. It was longer in the leg, but remarkably easy to fatten. Very little was done in the way of improvement of swine until about the end of the 18th century. In 1780 we hear of a tall, gaunt, racy hog in Ireland, as narrow as a slat, cat hammed, with large drooping ears. Just the kind of brute you would not care to argue with, and that fences would not hold. A little later the Old British breed was established. This was deeper bodied, better made, and shorter in the leg than the Irish, but still very coarse, and lacking in evenness and quality. From the date of the Old British breed down to the present time much improvement has been effected. England led the way in the production of high-class pigs. The Chinese and Neapolitan hogs were crossed on the Old English breed, and imparted to the progeny better form, more rapid growing and fattening qualities, greater fecundity, and a quieter disposition, while retaining in a large measure the size, hardy and vigorous constitutions, and good grazing qualities of the native breed. The most appreciated breeds in Australia at present are the Berkshires, Mid-Yorkshires, and Poland Chinas, in the order named. Some pigraisers have a preference for the Tamworth hog to cross on sows of the above breeds, and no doubt the crossbred pigs are splendid hustlers, and grow into fine bacon pigs, but I prefer the pure bred pig if procurable.

Berkshires and Poland China hogs are black, with six white points, i.e., four white feet, with blaze on face, and white tip to tail. The former is a British breed, the latter originated in the United States of America, and is especially suited to maize-growing country, where it was produced. Both are large pigs, but of the two the Berkshire scales at maturity about one-seventh more than the Poland China. To compare the two, the Berkshire is somewhat larger in the body, a little longer in the leg. The flank is not so flabby, and the belly much more trim and firm. The head is shorter, jowl lighter, and upright, while those ears of the Poland China are broken about two-thirds or three-quarters from the base. Generally, the Poland China is more thick in every way. The Mid-Yorkshire is not quite so large as the Berkshire, but much on the same lines, though entirely whits. The Tamworth is a long, deep, somewhat narrow red pig, set on fairly long legs, and has a long head and snout. One has only to compare the description of the old wild hogs with those of the present high-class breeds to realise how great progress has been made in the breeding up of swine. There seems now very little room for further improvement, and the great effort of breeders to-day is to keep their stock from reversion. Indiscriminate in-and-out crossing of breeds will cause this to a marked degree, and the breeding together of crossbred stock will, in a few generations, produce pigs with most of the characteristics of their wild ancestors. Those farmers who have used the Tamworth hog for crossing on grade sows will have seen plenty of evidence of this. The necessity for careful mating is apparent when we understand that the now popular Berkshire about 70 years ago was reddish-brown in color, spotted with black. When the careful breeder finds a sprinkling of sandy hairs through the white and black on the Berkshire to-day, he knows it is a 'throwback,' and a danger signal, for where reversion takes place in one feature others may follow quickly in its train. The same remarks apply to all the highly developed domestic breeds of swine we have to-day. The breeder of limited capital should secure the best-grade sows he can afford, and a good pure-bred hog. By rigidly culling and careful mating the fourth generation gives him pigs to all intents and purposes pure enough to breed true to type from then on. Another very helpful point is to secure the boars line bred if possible. A boar selected for use in a pure herd should be pure bred, and have the desirable characteristics of his breed. Many authorities advise selecting the boar while he is still young and on the sow. This method has its advantages, but only a keen and careful judge will be able to do this with any reasonable chance of success. The most pleasing to the eye while at this immature age often fail to develop satisfactorily, and the inexperienced buyers are almost sure to select the largest boar of the litter, irrespective of other features. The most successful sires are generally found amongst the medium-sized hogs. He should show marked masculinity, which denotes stamina, vigor, and ability to stamp his offspring with his own characters. The selection of a pure sow calls for quite as much judgment as of the boar. She should be true to type. Shape, color, and markings should be particularly noted. The shape of face, set and shape of ears, color of eyes, &c., should all be studied. With grade stock for bacon raising no attention would be paid to the so-called fancy points. The sow for breeding should have the indications of a good feeder, and be roomy in type, showing plenty of size for her age. She should have good length and depth of body, well-sprung ribs, broad back and loins, and deep, well-filled hams. Straight legs, well set, and short feet on strong pasterns should be found, and the back, from shoulder to croup, should be slightly arched. Never buy or keep a swayed-backed sow. The chances are when pregnant her belly will drag on the ground and cause udder troubles; besides, it is a defect that is often hereditary. See that she has 12 to 14 good teats, evenly spaced. The front teats should be placed well forward, near the fore legs. If purchasing a number of sows, have them as uniform as possible in every way. Having selected the herd boar, he must be given proper care and attention. Firstly, the proper kind and quantity of feed. A good ration consists of ground oats, barley, and pollard (with a little linseed meal added when in hard service), the whole mixed up with skimmed milk. Feed him regularly two or three times a day. Charcoal, lime, wood ashes, and copperas mixed and always within reach will help keep him in perfect health. Exercise is very necessary, and if possible he should be given the run of a small pasture. The boar should not be used for service too frequently. Until fully matured, only one service daily; after he is matured, two may be allowed. It is not good practice to use a boar while it is too young; if possible,

do not use bim before he reaches the age of eigbt months. Sows come into season when about seven or eight months old, but period may occur earlier if tbey have been forced. Unless bred, heat occurs about every three weeks, and lasts usually about three days. If possible, do not have them mated to ths boar until their third or fourth period. Keep the boar's tusks short and blunt, and greatly lessen the chance of the sow being knocked about. There is little bother, as a rule, with a maiden sow at 11 or 12 months, and the extra time permitted for maturing is of great benefit to her. She would then produce her first litter at 15 or 16 months of age, and the little pigs will have more stamina and be less susceptible to disease. Do not discard any sow on account of age until shs fails to produce regularly good healthy litters. It is well to note that the maiden sow intended to be bred should not be shy fed nor allowed to become very fat. If allowed to become fat the risk of sterility is greatly increased, as the functions of the ovaries are interfersd with. Sows sometimes fail to breed on account of being thin, weak, or run down in condition. By feeding these sows all they will eat of a good nourishing ration, and giving twice daily 20 drops to 40 drops of chlorids of iron to tone up the system, this cause of sterility will probably be rectified. The period of gestation is from 112 days to 116 days, sometimes a day or two over, but seldom less, unless there is premature birth. The pregnant sow should not be too closely confined, as lack of exercise frequently results in the loss of a litter and other troubles, such as indigestion, &c. If possible, make her get quite three-quarters of her living from pasture. A clover or lucerne field or rape paddock are about as good as can be grown for the purpose. Before turning in the sows tbey must be rung, and this ringing must be done before the sow is bred, or ill results may follow. If a paddock is not available, the sow should have the largest pen possible, and the shelter should be at the opposite end from ber feeding trough. Good nourishing food should be supplied sufficient to keep her gaining in wsight slowly all the time. A young sow of 450lbs. will need 6lbs. of grain, or its equivalent, every day to accomplish this. About a fortnight before she is expected to farrow she should be removed to her farrowing pen, and fed on cooling diet. Clean, dry rye straw makes the best bedding to farrow in. It should be chopped into 2in. lengths, otherwise the piglets will become tangled in the long straw. Wheat straw in short lengths is also suitable, but oat straw is so easily broken and heats much more readily. Avoid barley straw, as the beards are very bad on the eyes and ears of the young pig. The bedding in the farrowing nest should be changed at least twice a week. One great cause of losses with very young pigs is damp bedding. It becomes heated and steamy, and the little pigs, running out into the outside air while hot and moist, catch a chill and trouble results. Sows sometimes devour their offspring shortly after they are born. If she is properly treated while pregnant, and given plenty of exercise and sufficient protein in her feed, and a little oversight given at farrowing time, there will be little of this complaint. The afterbirth should not be left in the pen any longer than is necessary. To secure two litters a year the young pigs should be weaned at from six weeks to eight weeks of age. As a rule sows will come into heat three days after farrowing, but it is bad practice to breed them then. They cannot be expected to nurse one litter well while carrying another. I cannot speak too strongly against the advice often given to leave a couple of the smaller pigs with her for a week or so to dry her off. It is bad practice, and often causes the loss of several teats. Never stint the feed to dry breeding stock. Many farmers maks this mistake, but it is a fatal one. If you starve the pregnant sow foetus after foetus will shrivel and waste, and fail to develop, until at farrowing time the sow may, through no fault of her own, produce four or five pigs out of 12 or 14 well-started embryos. I know nothing that conduces to the production of large healthy litters more than lucerne, clover, or rape pastures, supplemented with a sufficisnt grain ration to keep the sows improving in condition. Oats in summer time and maize during the winter months are abont the best grains, but any grain will make satisfactory feeding. Wheat, barley, and peas should be crushed before feeding, if possible. Soaking answers nearly as well, bnt never boil any grain, or the loss will be greater than feeding whole and dry. The floor space of the farrowing pen should be 8ft. x 8ft., and high enough above the ground level to ensure dryness; but the best kind of floor is earth overlaying rubble. The sows seem to take to it better than a wooden floor, and it is warmer than bricks or cement. Around the walls 8in. from the floor 3in. x 2in. battens should be fixed, so that they will form

a fender frame 9in. from the wall and 8in. high. The farrowing pen should have a yard attached of half a square chain. With proper management during pregnancy, the little pigs should be born strong and lusty, and about 3¾lbs. to 3lbs. in weight. It is always advisable to keep on good terms with the brood sows, for attention at the time of farrowing is often necessary, not so much on the mother's account, but to take care of the little pigs. It not infrequently happens that when a piglet is passed, a portion of the enveloping membrane is wound around its head, and unless removed by an attendant, it causes the pig to smother. Others seem to become exhausted while passing through the pelvic arch, and unless their mouths are opened and air blown in to expand the lungs, they quickly pass away. Again, most sows that overlie their pigs do so before they are three days old. To avoid this, piglets should be put into a box securely fastened into a corner. It must be placed on top of the batten frame. A gin case is suitable, and it should have about an inch of short, chopped straw in the bottom. It should have two or three boards nailed across the top, to keep pigs from climbing out, but not covered at all closely. For the first 24 hours young pigs will need a drink from the dam every two hours throughout the day, and every three hours during the night. The second 24 hours they will be all right if at two and a half and four hours intervals. It is generally safe to leave them with the mother the third night. It may seem a lot of trouble to do this, but in reality it is not so; it only happens once in six months with each sow. Nothing is more annoying than to feed and care for a sow for four months, and to find her some morning with only two or three live pigs remaining out of a fine litter of 10 or 12. The proper care of the mother for the first week is most important, and will materially help to start the youngsters to robust life. Do not forget that at no other time will a pig gain weight so cheaply as while on its mother. Every advantage should be taken of this fact. If the sow is in good condition, and she should be in much better condition than most breeders think, she will not require much feed for the first 36 or 48 hours. As the sow pulls round—usually about eight hours from parturition—she will look for food, and it will be quite safe to give her a sloppy feed. Keep milk out of the slop till the third day, making it fairly thin, using bran and pollard (chiefly bran) to thicken the slop. Do not give more than a gallon at a time, and feed two or three times a day as she seems to need it. A full flow of milk may be expected from the sow about the third day, and she will from then on become more and more anxious for food. Avoid giving a heavy feed for a few days; the chief reason is the fear of upsetting the sow's system. Gradually increase both quality and quantity of the food, until in about 10 days she is receiving just about as much as she will eat. Skimmed milk, bran, pollard, barley, meal, and roots are all first-class as foods for the sow, and she should have about 1¼lbs. of grain per day per 100lbs. of her live weight for a fortnight, and up to 2¾lbs. per day per 100lbs. of her weight from then till weaning time. Where grazing can be had, rape pasture will supply quite a large portion of the food, and the grain ration will be considerably cut down. The main thing is, of course, to keep up a plentiful supply of milk for the little pig. A good brood sow will yield about 7lbs. of extremely high-quality milk daily, equal in fact to nearly 12lbs. of average cow's milk. The necessity for ample feed of a suitable quality while suckling is very apparent. As a rule the largest quantity of milk is yielded from the front teats. This accounts for the pigs reared on the front teats most times being more forward at weaning time than the rest of the litter. During the first fortnight the young pigs will require no other nourishment than the mother's milk. At the end of a fortnight they should be about 8lbs. in weight, and gaining about 6ozs. a day. If the sow has been fed in a broad, shallow trough, the young pigs will be learning to drink. As soon as they have learned, a small shallow trough should be put in a corner of the pen (hurdled off from the sow), and a little milk and pollard put in this at feed times. A suitable mixture is 1lb. of pollard to 15lbs. of sweet skimmed milk. I like to have the pollard or any other grain soaked at least 12 to 24 hours before feeding for all classes of swine. It is less likely to cause stomach trouble, and greater returns per pound of feed will be made. Should any be left over, clean out into the sow's bucket, and put fresh food in the trough. Never top up old feed. Always feed the little pigs first. A shallow wide trough for both sows and little pigs is very important. If allowed to drink from deep troughs, many of the youngsters will have bad-shaped backs, which no amount of feeding later will hide. It is a good practice to add a little bone meal to

the young pigs' feed, about ½oz. to the pound of grain used. Weaning should take place at about eight weeks of age, when the young pigs should weigh about 35lbs. each, and be able to get along all right without the mother's milk. They will, however, miss the warmth and shelter of her body, and if fed infrequently may suffer considerably from indigestion. Perhaps more pigs are ruined and made unprofitable through lack of proper care and attention during the month or two succeeding weaning than from all other causes. They should be fed the first week six times daily, and their slop gradually thickened, until at 12 weeks they are getting a ration of 1lb. of grain to 4lbs. of skimmed milk, and receiving about 1¼lbs. of grain per head daily, fed in four feeds. After 12 weeks, when they should be about 65lbs. live weight, they will start to move rapidly ahead, and will need more feed week by week. Twice a day will now be sufficient to feed them, if running on pasture. I strongly advocate pasture for pigs, and always like to run the growing stock out till about 20 weeks of age, when a month on the boards will top them off into prime pigs. Pastured pigs never seem to have any troubles like those closely penned, the cost of production is greatly reduced, and the resulting product bacon is firmer and of much better quality. When the pigs are about a month old, the males, unless intended for stud purposes, should be castrated. The cord should be severed by scraping with the blade of a knife. Scraping is preferable to a clean cut, as there is an artery in the cord. Scraping breaks the walls of the artery and prevents excessive bleeding. It is always advisable to use a little of some good disinfectant on the scrotum before and after castration. The cheapest and at the same time most satisfactory method of marking pigs for identification is by a system of ear punches."

TANTANOOLA.

June 2nd.—Present: 12 members.

MIXED FARMING ON A SMALL HOLDING.—In a paper with this title, Mr. A. McRostie said he would take as an illustration a farm comprising about 120 acres. Should one choose dairying as the main line, it would be necessary to have 12 to 15 good cows. He said care should be taken to milk and feed them at regular hours. He preferred Algerian oats for green feed, and they should be sown directly after the first rains to provide good winter feed. He would not allow the cows to remain on the feed for too long a period, one feed a day of hay or chaff would prevent scouring. He recommended ensilage for summer feeding. The separator was a saver of time, and the milk could be fed to calves and pigs, which did very well on it. It was best to allow the milk to cool before feeding to pigs. The small farmer should keep at least one brood sow and obtain, if possible, two litters a year. Pigs were a very profitable side line if given a little care and attention. A few sheep might also be kept for household use. Poultry, at present high prices, were well worthy of attention.

POULTRY BREEDERS.

On application (personal or by letter) to the Poultry Expert, Adelaide, Advice on Feeding, Breeding, Housing, and Diseases, &c., will be given.

Arrangements made for Lectures in Country Districts, and Visits of Inspection paid to Poultry Yards and Farms.

Publications.—On application Breeders' names will be placed on the Mailing List.

Monthly Notes in *The Journal of Agriculture;* subscription 1s. per annum, posted; 2s. 6d. Inter-State.

GOVERNMENT POULTRY STATION—PARAFIELD.

Inspection is invited of Stock and Methods Adopted.

PUBLIC VISITING DAYS—1st Wednesday and 4th Saturday in each Month.

EGGS AND POULTRY FOR LOCAL MARKET AND FOR EXPORT.

Instruction as to Age, Weight, and Methods of Fattening Poultry for the English and Local Markets.

EGGS.—Further particulars on application.

Please address all correspondence—

THE POULTRY EXPERT,

TELEPHONES { 6464. 6465.

ADELAIDE.

CROWN LANDS.

LANDS OPEN FOR APPLICATION.

Till 4 p.m. Tuesday, August 21st, 1917.

SOUTH-EASTERN DISTRICT.—OPEN FOR AGREEMENT OR PERPETUAL LEASE.

Lands in the hundreds of Archibald, Binnum, Caroline, Comaum, Coombe, Kongorong, Mingerow, Mount Muirhead, Naracoorte, Paech, Parsons, Pendleton, Robertson, Senior, Townsend, Waterhouse, Wirrega.

Closer settlement lands in Binnum, Green Point, Hatherleigh, Hynam, Mount Schank, and Struan Estates.

Miscellaneous lease—Lands in hundreds of Caroline, MacDonnell, Mingbool, Naracoorte, Rivoli Bay, and Tatiara.

Full particulars are published in the *Government Gazette*, and may be obtained, with plans, on application to the Secretary for Lands.

LANDS TO BE OFFERED SHORTLY.

Crown lands in various hundreds in the CENTRAL DISTRICT will shortly be gazetted open to application under perpetual leases and agreements to purchase.

Full particulars will be published in the *Government Gazette*, and will also be obtainable on application to the Secretary for Lands.

APPLICATIONS FOR LAND.

Intending applicants for any lands which are open are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portion of a block, if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey.

ALLOTMENTS, SALES, TRANSFERS, SUBLEASES, AND MORTGAGES.

Notice is hereby given that in future no applications for land, or for transfer, sublease, or mortgage of Crown leases or agreements will be approved to unnaturalised persons of *any* nationality, or to naturalised persons of enemy origin unless the consent of the Honorable the Attorney-General of the Commonwealth be first obtained by the parties making the application.

Where any doubt as to nationality exists, it will be necessary for certificate of birth or naturalisation papers to be exhibited.

The same principle will apply to land sold by auction.

OFFICIAL LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which may be seen at the principal Post Offices, and copies obtained at the Office of the Secretary for Lands. The List shows the Areas, Localities, Prices, &c., of the Sections available and the conditions under which they may be applied for.

NOTICE TO APPLICANTS FOR LAND.

The Land Board meets daily (when necessary) at the Board's Office, Department of Lands, to deal with applications received the previous day for any lands that may be open in the Official List. Applicants must either attend personally or send a full written statement. Forms can be obtained at Post Offices, or on application to the Secretary for Lands.

GEORGE RITCHIE,

Commissioner of Crown Lands and Immigration.

Roseworthy Agricultural College.

WALTER J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S.,
Principal.

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The First Session of each year begins on or about the third Wednesday in April and closes on or about the third Friday in July.

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The Third Session opens on or about the second Tuesday after the close of the second session, and closes at the completion of the vintage.

Applications for Prospectus and information should be addressed to—

The Secretary,
Agricultural College,
Roseworthy.

TO ADVERTISERS.

The "Journal of Agriculture" has a circulation of over 7,100 Copies monthly amongst the Cultivators of the Soil in South Australia, and consequently is a valuable medium for advertising Farm and Orchard Supplies and Requisites.

Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

"Fruit Tree and Grape Vine Pruning," by Geo. Quinn (Horticultural Instructor); price, 2s. 6d.; posted, 2s. 8d.

"Vinegrowers' Manual," by A. Sutherland; price, 6d.; posted, 7d.

Journal of the Department of Agriculture, 1s. per annum in advance; 3d. per single copy to residents of South Australia. Other places, 2s. 6d. per annum.

Any of the following bulletins and leaflets may be obtained by sending a penny stamp for postage:—

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STOCK AND DAIRYING—	
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Bot Flies and Bots	II.
Cocky Chaff and Straw as Feed for Stock	III.
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THE AGRICULTURAL BUREAU.—Particulars of this Organisation, of which every farmer should be a member, can be had on application to the Department.